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THREE APPROACHES TO THE STUDY OF PARENT–CHILD INTERACTION: ETHOLOGICAL, INTERVIEW AND EXPERIMENTAL*

HUGH LYTTON†
The University of Calgary

THIS PAPER discusses the methods employed in an investigation concerned with the emergence of social characteristics, particularly compliance, emotional dependence and instrumental independence in 2-year-old boys. This is being studied in relation to the mutual contingencies that parents and children offer each other in their daily encounters (environmental factors) as well as in relation to genetic influences. The genetic analysis will be based on a comparison of monozygotic and dizygotic twins and singletons, but this aspect of the research does not form part of the present paper.

The investigation emphasized the objective recording of detailed behavior observed in a naturalistic home situation as well as in an experimental, structured playroom task. The stress therefore was on behaviorally anchored primary data. In addition, however, we also employed overall ratings of child and mother characteristics, based on observation as well as interview.

ETHOLOGICAL APPROACH—HOME OBSERVATION BEHAVIOR RECORD

The most direct way of studying the effects of parent–child interaction or child behavior is to observe it. While this seems a truism the method has—probably because of its difficulty and time-consuming nature—not been put to use as often as one might think (see Lytton, 1971). Bijou *et al.* (1969) present a discussion of methodology of direct observation and illustrate it by means of nursery school observation, using a fairly summary code containing few categories. The present discussion is concerned with the observation of parent–child interaction, employing a different, more fine-grained code.

In adopting this essentially ethological approach, I was concerned to observe carefully and to record in quantifiable form the actual functioning of child and parents in their moment-to-moment behavior. What is important here is to identify the pressures and rewards that parents and children dispense to each other, the mutual contingencies that operate in the home. What are the typical experiences the child is exposed to on a regular basis? Which parent action typically precedes

---

* The research reported here was supported by Canada Council Grant No. S70-0049. Mrs. Deanna Piwowar was the research assistant who carried out all the field work during the first year. Dr. W. W. Zwirner was statistical consultant to the project.

† Requests for reprints should be addressed to the author at: Department of Educational Psychology, University of Calgary, Calgary 44, Alberta, Canada.

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or follows a given child action and which experiences does the child present to his parents? It is essential here not to overlook the child's initiating and active role because this is one way of investigating the biological givens in the situation, an aspect of the interaction that has often been neglected in the past (see Bell, 1971).

The behavior record had to meet the following specifications:

(1) Record to be complete for the child behavior of interest, as specified, as well as for the actions of others in the environment impinging on the child.
(2) Record to be accurate within the observer's capabilities.
(3) Recording to be done on the spot, so as to avoid distortions due to memory.
(4) Act of recording not to be too obtrusive.
(5) Record to be amenable to computer analysis.

It was first hoped that by leaving a videotape camera with the family and removing the observer, the embarrassment felt by the family in the presence of a silent observer would be reduced and a less biased and yet complete record of interaction obtained. This method was tried out in several families and all mothers reported that they were more conscious of and felt more constrained by the presence of the camera than by the presence of human observers. Moreover, if the observer was absent, the camera was also relatively fixed in its field of vision (though mothers were instructed to turn it on the child if the child was too long out of view, but this would only be done from time to time). This meant that much of the action was lost visually, though some of it could be reconstructed subsequently with lesser confidence by means of speech and other noises, only some of them intelligible, which were recorded on the tape.

For these reasons we abandoned videotaping as a regular recording procedure after the first three or four cases. Videotaping was retained however for the special purposes of facilitating inter-observer reliability checks and obtaining material for training observers (see below).

The form of behavior record chosen was a code which serves as a kind of shorthand and is also quantifiable (see below for details). Its essential aspect is that it can be directly converted to a count of specified types of behavior by hand or by computer analysis. At first this code was written down by the observer on the spot, because it was thought that dictating a running commentary into a microphone, even at a very low volume, would constitute an additional and unwelcome intrusion in an ordinary living room. The verbal interaction of the family was recorded on tape and this audio-record was used later to supplement and correct the observer's written record. After some trials, however, it was found that speaking the code into a microphone, in a low murmur, did not represent a significantly greater intrusion than did the presence of the observer by itself, and was not objected to by parents. We have therefore recently adopted the practice of speaking the code into one of two microphones of a stereophonic tape-recorder. The family's verbal interaction as well as high-pitched beeps from a timer at 10-sec intervals are picked up by the second microphone and recorded on the same tape as the spoken code.

This method of recording frees the observer's eyes for watching the on-going action and, above all, ensures that the spoken code can later be accurately identified with any given segment of verbal interaction and is therefore more easily corrected. One very striking effect of the change in procedure was a dramatic increase in the number of statements recorded, a fact which demonstrates that the observer was, in fact, able to *see* more when he dictated the code.

The code

The code used is based on the APPROACH scheme (Caldwell, 1969) which was originally developed for use in nursery schools. We have adapted it to form a Parent–Child Interaction Code (PACIC) and to accommodate the variables of interest in our investigation. (The Summary Code sheet and an example of a coded piece of interaction are contained in the Appendix.) The code in fact possesses such basic flexibility that investigators can, by modifying the meaning of some of the symbols, bring into focus and code in detail any particular area of behavior that they are interested in, while leaving in much rougher outline other areas on the fringes of their interest.

In the Parent–Child Interaction Code (PACIC) each relatively discrete unit of behavior is encoded as a six-place statement, using alpha-numerical characters. Caldwell (1969) calls this statement a kind of "behavioral clause" which possesses its own grammatical structure. The letter in the first place indicates the subject of the clause. The second and third place are occupied by a two-digit number representing the predicate. The letter in the fourth place indicates the object, the number in the fifth place provides the possibility of introducing up to nine different adverbs, describing the quality of the action, and the letter in the sixth place gives supplementary information over and above the adverbs in the fifth place. The most important items of supplementary information in the present investigation have been "*C*", indicating that the action is an instance of compliance and "*N*", indicating that it is an instance of non-compliance. The APPROACH code uses five-digit statements, consisting only of numbers, but we found it necessary to introduce a sixth place and alphanumeric characters in order to increase the potential information content of each statement. Statements can and often do contain blank spaces. An example of a statement would be: Child (*C*) goes (02) to mother (*M*) quickly (5), following her request (C)—"*C*02*M*5C". Lapse of time is marked on the record by a stroke for every 10 sec.

Training procedures

Gaining fluency in a complex code such as this takes many weeks of training. (We count on about 50–60 hr of training for a new observer.) A further object of training is to achieve uniformity of coding, so that any two observers using the code who note the same behavior will code it in the same way. Videotape is an invaluable aid in training, since any segment of interaction can be viewed again and again until the observer is satisfied with his coding, even though chaos has overtaken the family. In addition, experience in the live situation is, of course, also necessary so that the observer can become habituated to the complexities of real life interaction when he himself is present.

The Coding Manual for the APPROACH scheme, kindly made available by Dr. Caldwell, has been adapted for PACIC and this lays down the general rules as well as the definition of every symbol. However, even given this, to achieve reasonable uniformity of coding, many points have to be discussed with the trainee, as they come up in practice. Not every possible situation can be foreseen in a Manual and hence decision rules have to be laid down as the occasion arises, e.g. how to code a parent ignoring a child's request for help, while carrying on with an ongoing action. The establishment of a clear set of rules was part of the initial phase of the investigation when the experimenter and his associate first had to train themselves. What has to be decided, above all, is not only the exact code for a given item of behavior, but which type of behavior to record and which to omit, since in the welter of activity of the normal family it is neither possible nor desirable to record everything. In fact, this has turned out to be the most difficult area in which to lay down decision rules.

Problems of recording

The purpose of the investigation will determine the classes of behavior the observer will concentrate on. Since the purpose of this research was to study compliance, dependence, independence and activity level, all actions of the child were of interest and were to be recorded plus those actions by others that impinged on the target child (or twins). However, the code was designed to be more detailed and to present a fine-grained picture in the special areas of interest, but a more coarse-grained one in areas of lesser importance. Thus while we attempted to be very specific about expressions of command, request or suggestion, or about verbal interaction indicating attachment or hostility and defined carefully acts of compliance or non-compliance, we were less specific about the actual toy that the child played with (simply recording that he played with some movable object) since this was of no consequence in the context of our investigation. One could, of course, be much more selective in one's recording, e.g. concentrating exclusively on control sequences, but one would thereby lose the ongoing interaction and the stream of mutual contingencies obtaining between parent and child.

How do we define the "relatively discrete unit of behavior" to be encoded in a statement? Consider two extremes of a continuum: At one end you have as a unit "going to school", "playing catch" or similar events, extending over some time and comprising a number of subordinate acts: such units are clearly "molar events". At the other end you have actions dissected into their component parts, as is often done in ethological records; for example "threatening a person" is divided up into "stares at A, grimaces, lifts right arm, clenches fist, shakes fist", etc. Clearly this is a molecular description. In addition there exist actions of intermediate range: gestures, manipulating a toy, speech, which may occupy but a few seconds. While the extremes of the continuum are thus clearly marked, it is less clear where along the continuum the label "molar" ceases and the label "molecular" begins to apply, since these are qualitative descriptions without generally accepted criteria.

However, it is possible to look for criteria for defining a "discrete unit" either in the function or in the morphology of the act. In the present investigation it is essentially a functional criterion which determines the unit of action. Speech is broken up, where the research aims require detailed classification, according to the content or purpose, and physical movement is described with reference to purpose or intent, e.g. "plays with toy", "seeks contact", "threatens" are all considered units, coded by separate statements.

In addition, certain gross morphological changes of action determine the end points of units, e.g. "Child walks to mother" is one unit, followed by "Child climbs on mother's knee" as a separate unit. Information Theory suggests that only *changes* in the morphology of informational input have to be signalled for information to be accurately received and in parent–child observation studies this must, in my view, be interpreted as noticeable, gross changes rather than molecular ones. Hutt and Hutt (1970) in a chapter devoted to the question of the definition of behavioral elements write: "We only need a new code item when a new direction of movement or of orientation of contour occur . . . Where redundancy occurs, in the sense of the same movement being repeated again and again, we need not record every occurrence as a separate element, but simply record one behavioral element with an attached frequency or time label." (p. 31.)

Given the multiplicity of events in normal family interaction it became necessary to reduce the number of separate actions to be noted, within these general rules, in order to avoid "overloading" the observer. Specific, ad hoc rules had to be devised as these problems arose: getting up from a chair and walking—should this be coded as separate actions? (We do not) Smiling and approving—should they be coded separately? When father repeats the same command several times over in very quick succession or when another child in the family plays with father at the same time as the target child does—should all these be recorded as separate actions? Even within the decision rules laid down there is an inevitable variation of interpretation between observers which appears as unreliability, though the disagreement is on inessentials. Another problem of interpretation—this time in a more important area—is the decision whether in certain circumstances the child actually did or did not comply with a parent's request. For example, when the mother says to the child, "Eat properly!", the change in the child's behavior is often so minute that two observers may genuinely disagree on whether the child complied with the command.

None of these problems admits of an easy solution, but with greater experience with this kind of method may come greater refinement and definition.

Processing the record

On the day following the observation the observer listens to the stereotape and transcribes his spoken code into 80-column data sheets, at the same time inserting a stroke for each 10-sec beep recorded on the track carrying the family's verbal interaction. Often several actions occur in a ten-second interval, and on the other hand, one piece of behavior, e.g. watching TV may carry on unchanged over many intervals in which case the statement would be repeated once for every interval. Ten seconds is a length of interval that an observer can usually cope with; if one reduces this to, say, 5 sec, experience has shown that the need to make constant strokes distracts him from the accurate coding of the interaction. The observer listens to the verbal interaction, too, and will go over doubtful passages a second time. This correction stage is most important as many omissions or coding inaccuracies can be detected at this stage, with the audiotape of the family interaction serving as a reminder of what took place, and the various coding rules can be applied meticulously.

The statements and the attached time strokes having straightaway been placed in the appropriate columns, the entire record in sequence, plus a code indicating the initiator and terminator of certain interaction sequences, can then be transferred to punched cards (and later to tape) for computer processing. A special program has been written which analyses the raw data, sums the occurrences of any specified subject-verb-object combination (e.g. child speaks to mother, father makes a request of child, etc.), and gives their relative frequency. It also computes a number of other indices (e.g. the ratio of compliance instances to compliance plus noncompliance instances—$C/(C + N)$—called the "Compliance Ratio", or the "Duration of active behavior").

Inter-observer reliability

We computed inter-observer reliabilities by having two observers observe the same interaction and code it independently, both from direct observation, coded on the spot, and from video-tape recordings. The reliability was then worked out from the resulting two records in the way described by Caldwell (1969). When both observers coded the same behavior in the same way, it was marked "*A*" (Agreement); when they coded the same behavior by different codes, it was marked "*D*" (Disagreement); when one observer recorded an action and the other observer did not record it, it was marked "*X*". These last instances would arise because an observer may have overlooked a piece of behavior in the fast-moving scene or because he may have considered the act in question did not fall within the definition of recordable acts. Agreement was then worked out by the formula: $A/(A + \mathrm{D} + \frac{1}{2}X)$, after adding the *X*'s from both observers together. A second, less stringent formula was also used which did not count in the "extra" statements recorded only by one observer: $A/(A + D)$. This formula is a measure of the extent to which two observers agree on the *coding* of behavior which they both noted and recorded, leaving aside behavior which only one of them either noticed or thought recordable. Agreement was computed for all the subject-predicate combinations of a given observation.

TABLE 1. OVERALL HOME OBSERVATION RELIABILITIES SUBJECT + VERB COMBINATIONS

Observers and duration	(hr)	No of statements (longer record)	% jointly observed events	% agreement of subject + verb with "extra" statements $\frac{A}{A + D + \frac{1}{2}X}$	% agreement of subject + verb without "extra" statements $\frac{A}{A + D}$
1 $A + B$	2	458	50·6	44·9	78·0
2 $A + B$	2½	782	43·4	42·7	83·1
3 $A + C$	2½	754	51.8	44.1	80·8
4 $A + B$ (VT)	1	452	41·6	46·2	85·1
5 $D + E$ (VT)	1	737	74·5	59·3	75·9
6 $D + F$ (dictated record)	1	618	77·7	69·3	85·6

Table 1 gives the results of six reliability checks. It is clear that there exists far greater agreement on how to code a given observation than on what to observe. The increase in the observation reliability in the last study is very marked. By that time not only was there a simplified code in operation, but the rules had been more rigorously defined and there had been a prolonged period of training and repeated monitoring. In addition, very relevant is the fact that it was a more detailed record produced by each observer dictating coded statements into a separate microphone and it therefore embodied relatively more molecular coding than the first four records. This evidently produced an increase in the relative frequency of jointly observed events.

Interest attaches also to the inter-observer agreement for individual categories of behavior, rather than to predicates overall. We therefore looked at various specific categories. If one marks the records according to the presence or absence of, say, attention-seeking verbs in both, a vast majority of statements will not contain a verb indicating attention-seeking in either observer's record, i.e. both observers are agreed on the absence of attention-seeking in these statements. To count in these instances of "negative agreement", however, would spuriously inflate the extent of agreement. "Negative agreement" therefore was discounted and agreement was calculated by the formula: $2a/(2a + b + c)$, where a represents agreement on the presence of the category and b and c symbolize instances when only one or the other observer noted its presence (see Yarrow, Campbell and Burton, 1970).

TABLE 2. HOME OBSERVATION RELIABILITIES (SUBJECT-VERB COMBINATIONS) FOR CATEGORIES OF INTEREST (1 hr VIDEOTAPED OBSERVATION)

Child variables	% agreement $(2a/2a + b + c)$	*Parent variables*	% agreement $(2a/2a + b + c)$
Compliance	73·7	Compliance	74·0
Non-compliance	72·0	Non-compliance	84·2
Dependent behavior	52·3	Reasoning	33·3
Feeding	96·7	Commands/prohibitions	50·8
Demands	57·1	Verbal punishment	72·7
Verbal interaction	57·3	Warmth	72·0
		Play	66·7
		Verbal interaction	63·5
		Median	69·4

Table 2 lists the agreements for behavior codes within specific categories found in 1 hr observation (videotaped, observers D and E). They range from 96·7 per cent for "Feeding" to 33·3 per cent for "Reasoning", with a median of 69·4 per cent. Efforts will have to be made in later stages of the investigation to improve some of the less satisfactory agreements.

It must be clear that hoping to obtain the usual psychometric test standards of reliability in a free-flowing interaction situation is straining after the impossible. The observer is bound to select one response to record at a time from amongst several competing pieces of behavior. In a recent observation, for instance, a child was playing with blocks, his small sister and mother drifted in and out of the play and the child and mother were having a to-and-fro conversation at the same time. While these basic characteristics were noted by both observers, agreement was far from perfect on whether to record speech or child play or mother play at any one moment. Nevertheless the basic types of behavior—the behavior that counts—were agreed on by the observers and the categories derived from them will be a faithful reflection of relationships in this family. All one can claim is that the reliability coefficients from this study are at least comparable with those obtained in a similar situation with a similar code by Caldwell (1969).

Parents' reactions to home observations

It is obvious that the introduction of an observer in a home must affect relationships to some extent and produce some distortion of the "normal" interaction. A longer discussion of this point can be found in Weick (1968) and Lytton (1971). Unfortunately, while the existence of distortion is generally recognized, it is difficult to obtain experimental evidence on the degree to which it affects the data, since to do so one must procure as base-line a record unknown to the observed, a difficult feat both practically and ethically. Patterson and his associates (Patterson and Reid, 1969; Harris, 1969) have produced evidence which shows that the presence of an observer increases the variability of social behavior in families and also increases the positive "desirable" responses by parents.

In line with other investigators (see Moss, 1965; Baumrind, 1967) we took steps to try and minimize the distorting effects that our presence would be likely to have, particularly on parents. The observer while explaining the purpose of the experiment quite frankly would stress the child as the focus of interest and would underemphasize the role of the mother as subject. We also avoided being cast in the role of experts in child-rearing so as not to give the mother the feeling of being judged. In a preliminary interview we outlined our procedures, e.g. audio-taping in the home, and explained that, as observers, we could not be involved in the family interaction. We frankly put into words the embarrassment likely to be felt by parents in the presence of observers and asked the mother to act as naturally as possible under the circumstances. We also tried to involve her in the investigation by promising feedback of results.

What were our experiences in the homes that participated in the study? We certainly had the impression on occasion that parents were being consciously "good parents" in the sense that they played and romped with their children perhaps more than usual for our benefit. Yet, the usual climate of interaction in the home cannot be changed completely over two evenings, as for instance, when one mother kissed and hugged her children, but also yelled at them when she got exasperated (she also mentioned the yelling as a form of control in the interview). While some of the kissing may have been staged, we received the impression that this mother was, indeed, both warm and loving and easily irritated whether we were there or not. In another working-class home where father issued many imperious and impatient commands, mother tried to tone down her husband's peremptoriness by emphasizing "please" in her requests to the children. While she probably exaggerated this because of our presence, there was also no doubt a genuine difference in approach between the parents which was still visible with observers present.

Slapping also occurred in our presence, as a response to misbehavior, though probably with reduced frequency. In this connection it must be noted that the young child's behavior is almost unaffected by the observer's presence, so that naturally occurring situations will often, willy-nilly, bring out the parents' natural reactions which it is not completely in their power to suppress. This is a factor that contributes considerably to a reduction of distortion.

Whereas 2- or 3-year-olds seemed completely unabashed by the presence of observer or videotape camera, 6-year-olds were much more conscious of it and this led them at times not to be "good" but to fool around and clown particularly in front of the camera. On one occasion such "misbehavior" earned the child a slap, also caught by the camera.

Investigators have to accept the behavior seen as behavior-in-the-presence-of-observer. They will be justified in expecting it to deviate universally from normal interaction in one direction, towards social desirability, and thus certain allowances can be made, although one cannot be certain that the amount of deviation will be the same from family to family. Nevertheless, as between direct observation and interview, it would appear that distortion due to a social desirability set is less in the observed interaction, partly because the situation is not completely within the parents' control, whereas interview responses largely are.

Our experience with home observation derives, of course, from those families which agreed to co-operate. For singletons, these were largely obtained through Child Health Clinics which asked mothers whether they were willing to participate and the names of those willing were passed on to us. As for twins, we contacted all parents of male sets of twins born in Calgary in 1968 and 1969. Out of 18 twin families contacted in the first year and who were otherwise eligible and accessible, 5 refused to co-operate; out of 19 families contacted the second year none have refused—an encouraging sign. Whether any of the refusing families would have co-operated, had the investigation not involved home observation, it is impossible to say.

Meaningful variables

The rationale behind recording detailed and specific items of concrete behavior is firstly that it will provide us with the raw data with which to determine the contingencies of reinforcement that parents and child establish for each other. Some faith in the regularity of such contingencies is implied here, if some general and meaningful statement is to be made about the interaction of even one mother–child pair. In the second place, behavior count is based on the premise that summing individual behavior items will yield a valid and meaningful measure of a child's or adult's response tendency, e.g. that by adding up instances of "Child seeks parents' attention or help" we will be able to rank the child on the generalized response tendency "Emotional Dependence". Is this in fact so or are we in danger of not seeing the wood for the trees? Emmerich's findings (Emmerich, 1964, 1966) as regards behavioral measures of dependency as opposed to ratings must give us pause.

One test of validity—construct validity—is the extent to which a measure enters into a network of relationships with other variables in accordance with expectations derived from theory. In this context we are concerned with how far behavior counts, as indices of a variety of constructs, enter into such relationships, and not with how a particular construct shows up in this manner. As a companion paper will discuss in detail, preliminary results of this investigation show that behavior counts exhibited a reasonable number of associations with expected other measures, though these associations were more with overall ratings than with other behavior counts. The

Compliance Ratio and relative frequency of speech, particularly, showed a meaningful network of such relationships and there thus exists tentative evidence of their construct validity and heuristic usefulness.

However, there is always the danger that in recording second-to-second movements and acts one is led, by following predetermined rules without regard to particular circumstances, into unintended and meaningless distortion of variables or into not "catching" a variable at all. Thus, when a child played a game with father, father asked him to give him one toy animal after another from his zoo, which the child did. Scoring each of these interchanges as "command" and "comply" would give a misleading picture of the contingencies obtaining in this family, since commands are added up to the general characteristic of "restrictiveness" and complies to "compliance". In another case a child constantly stayed with his mother and talked to her more than the other twin did. This sign of dependence was not easily picked up by the detailed code, because "talking" is not counted as a sign of dependence, we found it impossible to include simple proximity in the code and he did not often walk after his mother which would have counted as dependence. The observer's impression of high dependence was obviously correct, however. In both cases special steps had to be taken and rules evolved to correct an otherwise misleading behavior count.

It is clearly necessary to keep an ever-wary watch on the overall outcome of recording specific behavioral acts.

INTERVIEW-RATING APPROACH

While the main thrust of our efforts went into the development of feasible, practical and reliable observation and experimental methods, I did not want to forgo the possibilities that lie in overall impressions, nor lose all information that was not based on direct observation. We therefore employed a variety of different probes into parent–child relationships, particularly two interviews with the mother and a 24-hr record of events kept by the mother, and summed up the evidence from these diverse sources by means of global ratings of parent and child characteristics.

As Yarrow (1963, p. 217) has written: "Mothers' interview responses represent self-description by extremely ego-involved reporters." One consequently tends to be wary of the interview procedure. However, only a segment of parent–child interaction can be observed in two 3-hr observation periods and it seemed important to find out about events and times that were outside the observer's view. There is some reassurance in the fact that it seems when mothers know there are other sources of evidence available their reports in interviews become more veridical than would otherwise be the case (Kohn and Carroll, 1960). It was expected the observation periods would have this effect in our case. Above all, the interview and diary were only used as supplementary sources of evidence and where they contradicted the evidence of the observer's senses they were disregarded in arriving at the ratings.

By themselves ratings provide no information on the actual behavior observed, but constitute a high degree of abstraction from it. Apart from distortions due to subjects, we here have an additional source of bias residing in the rater, since he will weight the evidence on which the ratings are based in a complex and not easily specifiable manner. (As will be seen later, these strictures apply more to the mother than the child ratings.) However, one could not be certain how far the behavior counts would serve to uncover relationships between child and parent variables and overall ratings were included as a form of insurance. Our data will provide an empirical base for deciding how far behavior counts and how far ratings are useful in establishing relationships between dependent and independent variables and particularly relationships predicted on theoretical grounds.

My intention to include ratings was confirmed by the evidence produced by Emmerich (1964, 1966) who showed that measures of dependency based on observations did not clearly cluster together, nor did they load on the same factors, whereas teacher ratings did. As Maccoby and Masters (1970) argue a "trait" is an organizing concept in the mind of the rater by means of which he selects certain cues from the subject's behavior and superimposes a certain dimension on it. The value along this dimension allotted to the subject, however, is not independent of his "real" behavior. In fact, the rater may overcome some of the fragmentation inherent in straight behavior counts and, by giving weight to some subtle or unique clues, may be able to bring out a quality and unity in the subject's behavior that the count is unable to reveal. The essential requirement is that he should make explicit the evidence on which he bases his rating or judgement. The following is an example from the present investigation: A child went into a screaming fit when he was prevented from doing something he had set his mind on and turned nearly blue in the process. His mother's reaction to this was to say very coldly: "Well, turn blue if you want to". In the behavior count this would count as one (perhaps the only) hostile comment, in the ratings the rater would give it considerable weight in assessing the mother's "warmth".

Interviews and "diary"

The initial interview was concerned with obtaining family, demographic and historical information about the child. The second interview probed into more delicate issues and it was therefore not conducted until the end of the second observation, by which time mother and investigator were on more familiar and relaxed terms. This interview was for a large part patterned on the one in the study by Sears, Maccoby and Levin (1957) and the questions were geared to the areas of concern in the present study. They were intended to elicit the mother's perceptions of the child's characteristics, as well as her own habitual practices and attitudes to child-rearing. The interviewer who had received special training for this task, adopted a deliberately neutral tone so as not to suggest any particular mode of action as specially desirable. Although there were certain instances of trying to create a good impression, nearly all mothers almost defiantly mentioned some practices which they supposed were not acceptable to advocates of "progressive" child rearing, in particular spanking. The responses were noted verbatim and the interview was also tape-recorded for later checking.

Mothers were asked to write a record of all the events and incidents concerning the child over a 24-hr period, writing a segment every hour or so during the day. They were particularly requested to note their own reactions and feelings about the child's doings. In this way it was hoped to obtain a very factual record of events and interaction which, since it was written near the time of their happening, would be subject to very little distortion. It was also hoped that since the mother would be expressing her reactions "hot", as it were, the record would provide a fairly accurate reflection of her feelings which would not have been filtered through too much conscious attitudinizing. Some records were, indeed, very useful and informative accounts of the trials and tribulations of a mother of a young family. One mother, in fact, sent us two accounts, because the first one was written on a "bad" day—very vividly portrayed—and she did not want it to stand on its own. Other diaries, on the other hand, were too confined to the trivia of daily life, gave no hint of conflict situations and suppressed the mother's own feelings and actions so completely that they were of little use. Where there were gaps or obscurities in the Diary these were followed up during the second interview in order to explore the mother's feelings and reactions further.

Ratings

Rating scales were established specifically for this investigation. The mother ratings were given by the chief observer who was present for two observations and also conducted the two interviews. In order to avoid contamination, the child ratings were allotted by a second observer who was present during one observation and who read the diary, the interview protocols and the second observation record.

The child was rated on maturity of speech, compliance, emotional dependence and instrumental independence. The last two ratings were arrived at by averaging ratings on very precise behavior tendencies, e.g. attention-seeking, reaction to separation from mother, feeding and dressing himself.

The mother was rated on induction, warmth, use of psychological or material rewards, verbal or physical punishment, consistency of enforcement, degree of restrictiveness, amount of play with child, support of dependency behavior, encouragement of mature action and monitoring of child, based on evidence as described above.

The inter-rater reliability for mother ratings was 0·82 and for child ratings 0·65. It should be noted that it was the child ratings, with the lower reliability coefficient, which were based on the more precisely defined and more fragmented indicators of generalized traits. As will be described in a companion paper, these ratings exhibited a number of associations in accordance with theoretical predictions.

EXPERIMENTAL APPROACH

The experimental approach formed the third leg of the study and consisted of structured situations and tasks administered in the University playroom. The child variables under study were the same as in the Home Observation and the purpose was to elicit behavior indicative of compliance, emotional dependence and instrumental independence under controlled conditions. The advantages of holding constant the external conditions and of controlling the essential stimuli to which the child is to react need hardly be stressed. Whether the artificial nature of the situation also alters the expression of child behavior so that the experiment may not reflect either the "real" characteristics of the child or the normal relationships is, of course, the crucial question which will be discussed in connection with our preliminary findings.

The playroom, approximately 18 × 15 ft, contained a table for carrying out the task and tests, chairs and a number of toys, e.g. telephone, guns, cars, dolls, wheeled elephant, as well as a sandtray in which a toy village was built up. The floor was covered with a canvas sheet marked out into numbered three-foot squares. From an adjoining observation room an observer recorded child and mother behavior through a one-way vision mirror. Verbal interaction was relayed through a speaker to the observation room and was also tape-recorded.

The procedure will not be described in detail, but it consisted essentially of a period of free play, of mother pretending to leave and then leaving the room, of a formboard task, and of the Peabody Picture Vocabulary Test and parts of the Denver Developmental Screening Test, both administered by the experimenter. Detailed instructions were given to the mother about each part of the procedure and she was asked to tell her child that he could play with all the toys in the room, except with the sandtray, as the things in it had been built up for some other children.

Measures

The child was given a score on each of the behavior facets that were experimentally elicited. Each score was on a five point-scale and it was based on the child's action observed within a prescribed number of minutes. Although the format of the scores is identical with that of the ratings based on home observation, interview, etc. they are in fact not overall impressionistic ratings, but scores derived in a comparatively precise and objective manner. Activity level was also measured.

The score for *Emotional Dependence* was the average of sub-scores based on amount of initial exploration of the room during the free play period, reaction to mother's pretend leaving and actual leaving.

The score for *Instrumental Independence* was the average of sub-scores based on the child taking off and putting on his coat and on the extent to which the child attempted the formboard task without asking his mother for help.

The score for *Compliance* was the average of sub-scores based on compliance with the prohibition of play in the sand, both in mother's presence and her absence, willingness to try the formboard task and the tests, and readiness to tidy up toys when asked

Activity Level was measured by the number of different toys the child picked up and the number of marked floor squares he traversed in 10 min exploratory play.

Since our instructions constrained the mother's behavior to prescribed classes of actions and in prescribed ways, her behavior could be rated only in one area, i.e. the amount of pressure she exerted to secure compliance with her requests. Her control behavior was also classified according to certain categories.

Inter-observer reliabilities of experimental measures (playroom)

For five children two observers independently allotted scores on the experimental playroom measures. The inter-observer reliability coefficients ranged from 0·72 to 0·92 and over all subjects it was 0·82. These reliability coefficients are at a level expected in psychometric testing and were achieved with a comparatively small amount of training and effort.

The experimental procedures followed standard practice and no special problems that merit discussion presented themselves.

CONCLUSION

The ease with which a high level of reliability was obtained for the playroom experimental measures, compared with the difficulty with which any similar "respectable" level of reliability was achieved in the Home Observation Behavior Count is an index of the comparative complexity and difficulty of the two situations. In the playroom-laboratory the experimenter has pre-arranged the stimuli and is in almost complete control of a largely predictable situation. In allotting scores the investigator abstracts only certain aspects of the immediate multi-faceted action on which he imposes a predetermined category system. In the fast-moving, free-flowing home interaction, on the other hand, the investigator faces a situation that is just the reverse—chaotic, disorderly, unpredictable, uncertain. To create an orderly, yet faithful and reliable account, consonant in detail with another observer's account, is a task of major proportions.

It cannot be denied that the investigators felt much more competent, and therefore comfortable, in the experimental than in the home situation. Employing the two approaches side by side helped one to understand psychologists' preference for the experimental laboratory approach.

The interview-rating approach also proved relatively free of problems in its application and moderate reliabilities between raters were obtained. Its problems are more hidden ones, lying in the area of possible undetected bias and distortion of data. However, firstly in view of the demonstrated difficulty of establishing reliable data based on direct observation of small-scale behavior units and secondly because of the possibility that some important aspects of the parent–child relationship slip through the net of behavior counts, the inclusion of ratings in the overall design is no doubt a sensible precaution.

In the present investigation the three methods are being employed in parallel. To the extent that they corroborate each other the researcher can have increased confidence in the stability of his findings. However, they need not all be equally valuable. An important question is, which method or methods provide the more meaningful results or in other words, which approaches generate variables that exhibit relatively the most stable and theoretically explicable network of relationships linking children's social characteristics to parents' socialization practices.

SUMMARY

The problems of naturalistic observation, interview-ratings and experiments are reviewed as they presented themselves in an investigation of the emergence of social characteristics in 2-year-old boys. The methods adopted for obtaining a behavior record in the home are described in detail. Reliability figures are reported and the difficulties of achieving reliability in such data are compared with the relative ease of achieving good reliability in experimental settings. The important question, it is concluded however, is which method provides theoretically more meaningful results.

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APPENDIX

PACIC—PARENT–CHILD INTERACTION CODE
(ADAPTED FROM B. M. CALDWELL'S APPROACH SCHEME)

I	*Subject of Behavioral Sentence* (*1st Place*)
O	Observer
C	Central figure (CF)
T	Twin
M	Female adult
F	Male adult
G	Female child
B	Male child
W	Family as a whole
E	Environment
I	Item
N	Food, nourishment
R	Relative, Friend
P	Pair (of twins)
Z	Setting alert

II, III	*Behavioral Predicates* (*2nd and 3rd Place*)
	Environmental Contact (00–09)
00	Ignores
01	Attends
02	Locomotes (towards)
03	Establishes, seeks or maintains contact
04	Terminates contact
07	Seeks approval, attention
08	Seeks help
	Information Processing (10–19)
11	Shows (to) or demonstrates (for), reads to
12	Communicates or converses
13	Writes or draws (for)
18	Informs about culture (rules)

	Caretaking Procedures (20–24)
20	Feeds
21	Gives food (to)
22	Dresses
23	Washes, wipes, combs

	Manual Activities (25–29)
25	Transfers item (to or from)
27	Manipulates
28	Transports, holds

	Negative Reinforcement (30–39)
30	Contradicts, refuses
32	Expresses displeasure, discomfort (to)
33	Criticizes or derogates
34	Expresses hostility
35	Interferes or restricts
36	Resists or rejects
37	Threatens or frightens
38	Assaults
39	Withdraws privileges

	Positive Reinforcement (40–49)
40	Permits or sanctions
42	Shows pleasure
43	Approves, encourages
44	Expresses affection, solicitude (vbly)
45	Facilitates
47	Bargains, promises
49	Rewards tangibly

	Body Activities (50–59)
51	Sits, lies, stands inactively
53	Sits on knee (of)
54	Strokes, comforts
55	Perioralizes
56	Acts in situ
57	Plays—large muscle (with), dances

	Miscellaneous (60–69)
60	Acts or occurs
61	Tidies up
64	Disorganizes
65	Disintegrates emotionally
66	Makes music (with)
67	Eliminates

	Control Techniques (70–79)
70	Suggests
71	Requests, orders
72	Requests permission
73	Inhibits
75	Offers
77	Reasons
99	Unsatisfactory record

IV	*Object of Behavioral Sentence* (4*th Place*)
	Same as 1st place
—	No information

V	*Adverbs Describing Action* (5*th Place*)
1	Playfully
2	With irritation
3	Quietly, gently, carefully
4	With intensity
5	Quickly
6	Slowly, with reluctance
7	Ineptly
8	Imitatively
—	No information

VI	*Supplementary Information* (6*th Place*)
O	Negative
V	Accompanied by verbalization
P	Involving interpersonal physical contact
P	(with 37) With physical punishment
C	In a specified manner, place or time (comply)
N	In a manner, place, or time other than that specified (non-comply)
T	In continuation
S	Simultaneously
H	With adult help
I	Interchange of conversion
D	(with 37) With deprivation of privileges
L	(with 37) With deprivation of love
–	No information

SAMPLE FRAGMENT OF CODED INTERACTION

Father romps with child, but in gentle manner.
F57C3–

Child giggles. Child shows father a book and talks about it.
C42– – – C11F–V

Grandma enters the room. Child sits on father's knee. Child laughs.
R02E– – C53F– – C42–4S

Child sits on Chesterfield and handles book.
C51E– – C27I–S

Child hits father with book. Father says, "Ouch".
C38F– – F32C– –

Father hits child with book. Father: "Does that hurt?" Child: "Yes, it does."
F38C– – F12C– – C12F– –

Child romps with father. Child laughs.
C57F– – C42–4–

Father: "You know you shouldn't hit".
F18C– –

Father: "Go open the door". Child goes to open the door.
F71C– – C02I–C

Child returns to father. Child continues playing with father.
C02F– – C57F–T

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SEX DIFFERENCES IN NEWBORNS WITH SPECIAL REFERENCE TO DIFFERENCES IN THE ORGANIZATION OF ORAL BEHAVIOR

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BEHAVIORAL sex differences have been noted in young infants at a very early age. For example, Watson (1969) in conditioning 14-week-old infants, found that boys respond more to visual reinforcement whereas girls learn better through auditory reinforcement. Lewis *et al.* (1966) in an experimental study with 24-week-old infants, observed that boys paid more attention to geometric forms, while girls were most attentive to human faces. Moss (1967) noted that 3-week and 3-month-old boys cried more than girls. These are just a few of the studies which have revealed definite early sex differences. At the same time, evidence is also mounting that from a very early age, parents, particularly mothers treat boys differently from girls. Thus, Moss and Robson (1968) found for example that in response to fretting 3-month-old infants mothers are apt to respond to girls by talking, looking and offering a pacifier, while they are apt to hold close their baby boys or to offer them distractions. With another sample of 3-month-old infants Lewis (1972) found very similar responses in mothers; they vocalized more frequently to girls and they held boys more often than girls. Lewis concluded that in the interaction between mothers and infants, boys are apt to receive more proximal and girls more distal stimulation. Judging from a recent study by Thoman *et al.* (1972), this difference in maternal treatment according to the sex of the child starts right after birth. Primiparous mothers at least, talk to and smile at their baby girls significantly more during feeding than they do with boys.

The question arises whether the sex differences noted in the earliest months of life are entirely a function of differential maternal treatment. There is little doubt from the literature that there is constant parental reinforcement of what culture considers to be sex-appropriate behavior. (For reviews of this issue see Maccoby, 1966; Mischel, 1966; Olley, 1971.) However, as Olley (1971) pointed out, differential maternal behaviors may also be in response to subtle sex differences in the infants. To resolve this issue, the obvious time to study sex differences is right after birth when differential maternal treatment will not as yet have had a chance to have much impact.

In this paper, I shall review those sex differences which have been found among newborns in our neonatal studies as well as in the studies of other investigators. I will also present in detail new evidence from an analysis of 32,000 ft of film which points to sex differences of certain aspects of oral behavior in the newborn. The paper will conclude with an attempt at synthesis of the various findings on sex differences in the newborn. This synthesis will try to determine whether already

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at that stage of development, certain behavioral attributes emerge as more or less male or female.

Reported research findings of behavioral sex differences in newborns

On the whole, few neonatal studies have revealed sex differences. This is partly true because frequently investigators have not analysed their data for sex differences. Those studies which did assess sex differences have often shown only inconclusive results. Where sex differences have been found, they have mostly been differences in responsiveness, particularly to external stimuli. By contrast, few differences have been found in the primary expressive behaviors such as are involved in measures of spontaneous activation.

To illustrate, several studies have explored sex differences in *tactile sensitivity* among newborns. Those studies which did reveal differential tactile responsiveness pointed to greater sensitivity in females. Bell and Costello (1964) found females to be more responsive to the removal of a covering blanket and to air jet stimulation to the abdomen. Wolff (1969), in a longitudinal study of a small sample of infants observed that girls aged two weeks were more sensitive to skin contact than boys. Lipsitt and Levy (1959) in assessing electotactual thresholds in newborns found significantly lower thresholds in females which suggests that females are more sensitive to certain pain stimuli.

Females also appear to be more responsive to sweet *taste*. Nisbett and Gurwitz (1970) found that when females were given sweetened formula they increased their consumption of milk significantly more than did males. Females were more responsive to the taste of the formula at each body weight level tested.

No sex differences have been demonstrated in *auditory* receptivity. Eisenberg (1972), who has tested the auditory responsiveness of hundreds of neonates under carefully controlled conditions, has found no sex-dependent differences. In a study of individual differences Korner (1971), found no sex differences in response to an 80 db buzzer. Similarly, Engel *et al.* (1968) were unable to find such differences in the latency of response on EEG to acoustic stimulation.

In the *visual* modality, an interesting discrepancy appears to exist depending on whether sex differences are assessed with respect to active visual behavior or photic receptivity on EEG. In the latter, females are significantly more sensitive than males. In testing the mean photic latency in Oriental, Caucasian and Negro neonates, Engel *et al.* (1968) found significantly shorter latencies in females than males in each of the three races. By contrast, we were unable to find sex differences in the visual tracking of a moving object (1970). Results regarding the state of visual alertness which is neither as active as visual pursuit, nor as passive as the latency to photic stimulation appear to be contradictory. Boismier (1970) making prolonged observations extending over several days involving a small sample of neonates, reported that girls spent significantly longer periods in the state of alert inactivity than boys. Korner (1970) and Korner and Thoman (1970), using briefer observation periods with larger samples found no sex differences in visual alertness.

While a case could be made that newborn females are more receptive to tactile, visual, gustatory and painful stimuli, no sex differences have been reported in such expressive behaviors as spontaneous activity and crying. Several studies, some of which used large samples of neonates, monitored neonatal activity and none of them found reliable sex differences in the frequency of motions (Brownfield, 1956; Campbell, 1968; Korner *et al.*, 1968; Pratt, 1932). In a film study (Korner *et al.*, 1968) we analysed separately small, small multiple, global and diffuse motions and none of these were more relied upon by either sex. While Moss (1967) found significant differences in crying by 3 weeks of age, with boys fussing more than girls, no such differences have been demonstrated immediately after birth (Fisichelli *et al.*, 1963; Korner *et al.*, 1968). Similarly, no sex differences have been found in the reduction of crying in response to maternal types of soothing interventions (Korner and Thoman, 1972).

In a study in which the spontaneous discharge behaviors which occur during sleep were monitored, we found highly consistent sex-related trends (Korner, 1969). Wolff (1966), who was the first to monitor these spontaneous discharges, postulated that since no known stimulus evokes these behaviors, they may represent the discharge of a neural energy potential, which occurs in inverse proportion to the degree of afferent input. In our study (Korner, 1969) spontaneous startles, reflex smiles, erections and episodes of rhythmical mouthing were monitored during 2 hr 20 min divided in six observation periods. The mean hourly rate for each of these discharges was calculated for each of three sleep states, namely regular sleep, irregular sleep and drowse. In each state, the mean hourly rate of startles of males exceeded that of females. By contrast, females exceeded in reflex smiles and rhythmical mouthing in each of the states in which these behaviors occur. Since the overall rate of spontaneous discharge behaviors was almost identical for males and females when erections were excluded, it appears that females make up in smiles and reflex sucks what they lack in startles. If indeed these behaviors represent the discharges of a neural energy potential, it appears that females tend to discharge this potential more frequently via the facial musculature particularly of the mouth region, whereas males tend to discharge it more frequently through total and vigorous body activation. Possibly, the male's greater tendency to startle can be taken as an index of greater muscular endowment, seen also in his greater capacity to lift his head shortly after birth (Bell and Darling, 1965) and certainly in most of his later development.

Our finding that females engage in more frequent reflex smiles than males finds confirmation in observations by Freedman (1971). In our sample, the rate of reflex smiling during irregular sleep was almost triple that of males ($p > 0{\cdot}06$). The finding that girls engage in more rhythmical mouthing requires replication with more extended observation periods and a larger sample. Even though the hourly rate of rhythmical mouthing in females was almost twice that of males, this difference fell short of statistical significance. Rhythmical mouthing, in contrast to the more common spontaneous sucking of the neonate, comes in distinct bursts, separated by intervals of total inactivity; the lips are closed and the sucks occur in rapid succession and are of very small amplitude. There is yet another ryhthmical, intra-oral behavior pattern in which females appear to surpass males, namely that of small amplitude quivering oscillations of the tongue, first observed by Balint (1948) during bottle feedings. According to Balint, females show this rhythmical clonus of the tongue much more frequently than males.

In contrast to these rhythmical, intra-oral, small amplitude sucks, which,

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according to Wolff (1966), are probably of central, neural origin, no sex differences have been observed in the frequency, rate or amplitude of ordinary, spontaneous sucking (Hendry and Kessen, 1964; Korner *et al.*, 1968), of sucking on a pacifier, or sucking for food (Dubignon *et al.*, 1969). This type of sucking is strongly influenced by the overriding and sex-unrelated biological function of hunger (Hendry and Kessen, 1964; Korner *et al.*, 1968) and high arousal (Bridger, 1962). Also, there appear to be no sex differences in any of the behaviors which require movement and coordination of the hands to the mouth. Thus, Korner and Kraemer (1972) found no reliable sex differences in the frequency of hand–mouth and hand–face contacts and of finger sucking, nor in the efficiency or perseverance of these behaviors.

While no sex differences emerged either in the skill or in the level of activity underlying the hand-to-mouth behaviors, we found highly significant differences in the *style* of hand-to-mouth approach between the sexes. Since the evidence for this difference has never been presented, it will be briefly described below.

Individual and sex differences in hand-to-mouth approach behavior

In a study on individual differences at birth (Korner, 1971), we observed that in the approach behavior of hand-to-mouth, in some infants this approach behavior was heavily mouth-dominated while others primarliy sought such contact by coordinating the hand to the mouth. Considering Hoffer's (1949) work on the "Mouth, Hand and Ego-Integration" we wondered whether there were not from the start predisposing qualitative and quantitative differences in hand–mouth coordination which might differentially affect this integration. Since we had taken 1000 ft of film on each of 32 normal newborns in 16 times samples which were identical in length and in the interval since the last feeding for each infant, we were able to assess the relation of hunger, individuality and gender to these differences in hand-to-mouth approach behavior.

METHOD

Subjects

The infants were 32 full-term Caucasian neonates ranging in age between 45 and 88 hr. Seventeen were male, 15 were female. Every effort was made to exclude infants whose behavior might have been influenced by the effects of pre- or post-natal complications. To this end, a series of stringent selection criteria were applied. (For a list of these see Korner and Kraemer, 1972.)

Method of film analysis

The film was analysed with the help of a Kodak Analyst which permits viewing of film at various speeds ranging from 1 frame at a time to 24 frames per sec. Film was run at 24 frames per sec until a hand–mouth contact occurred. In order not to confound the scoring with mouth opening during yawning or with accidental hand–mouth contacts during the flailing motions of crying or the flexor motions of startles, instances of hand–mouth contact during yawning, crying or as the result of startles were excluded from the analysis. Otherwise, whenever a hand–mouth contact was seen, the film was stopped and reversed to the point where the beginning of the hand-to-mouth coordination could be identified. The approach behavior was then analysed at the speed of 4 frames per sec. Four types of behavior sequences were observed. These were:

1. *The hand approached the mouth.* This category was scored when, with the hand approaching the face, the mouth opened only when contact was established.

2. *The mouth approached the hand.* For this category to be scored the mouth had to open when the hand was at a distance of at least $1\frac{1}{2}$ in. or more from the face; also, the infant's head strained forward in an effort to meet the hand.

3. *The mouth opened when the hand was very close.* This was scored when the mouth opened with the hand being at a distance less than 1½ in.

4. *The mouth strains after the hand to maintain contact which had been established.*

By far the most common behaviors were in the first two categories. In fact, scores 3 and 4 combined comprised only 10 per cent of all responses. Since scores 3 and 4 contained both hand approach and mouth seeking, half of each was assigned to scores 1 and 2 for the purposes of the data analysis.

Observer reliability

Both inter-observer and score-rescore reliabilities for the same observer were obtained periodically throughout the period the film was analysed. This was done primarily to avoid subtle changes in scoring criteria over time. Reliabilities of both types were calculated on the basis of dividing the number of agreements by the combined number of agreements and disagreements. Average inter-observer agreement was 95 per cent. Score-rescore reliability averaged 96 per cent.

RESULTS

For the sample as a whole, the most common approach behavior was hand-dominated (the group average was 66·7 per cent). When the proportion of the mouth-dominated approaches was examined for individual and sex differences, interesting variations emerged. An analysis of variance was used to simultaneously assess the effect of sex, of the time since the last feeding and of the individuality of the infants within the same sex on the proportion of mouth-dominated approaches. The sex of the child had the most marked influence on the infant's approach behavior, with girls engaging in significantly more frequent mouth-dominated approaches than boys ($F = 8{\cdot}01$, *d.f.* 1, 90, $p < 0{\cdot}01$).

Within the same sex, the children differed significantly from each other in how much they engaged in mouth-dominated approach behavior, which, at the same time reflected the marked stability of this behavior within the children. This was demonstrated in two ways, namely through the above analysis of variance and a coefficient of rank concordance. The F value obtained was 2·69, *d.f.* 30, 90 $p < 0{\cdot}01$, and the coefficient of rank concordance was 0·44, also significant at $p < 0{\cdot}01$. Some individuals were so consistent in their style that one could accurately predict the proportion of each of their approach behaviors from one observation period to the next. For example, when 1000 ft of film were taken of one infant on each of two consecutive days, the proportion of her approach behaviors varied only from 0–2 per cent between observation periods from one day to the next.

Time elapsed since the last feeding also appears to increase the proportion of mouth-dominated approaches. Within the same sex, hunger seems to exert a significant effect ($F = 3{\cdot}92$, *d.f.* 6, 90, $p < 0{\cdot}01$).

The proportion of hand-dominated or mouth-dominated approaches appear to be unrelated to the frequency, efficiency or persistence of the infant's hand-to-mouth coordinations. None of the correlations run between these parameters were significant.

DISCUSSION AND SYNTHESIS

Research findings of behavioral sex differences at birth are as yet few in number. A review of those studies which have explored this issue to date, suggests that such differences do exist in the newborn. More than the results of any single study, it is the cumulative evidence from a number of studies which points to innate sex differences in special target areas. The female emerges as more receptive to certain types of stimuli and as orally more sensitized. At the same time, she is in no way less active or expressive. Specifically, the female has been found to be more responsive than the male to cutaneous stimuli (Bell and Costello, 1964; Wolff, 1969), to electrotactual (Lipsitt and Levy, 1959) and photic stimulation (Engel *et al.*, 1968), and to the taste of sweetness (Nisbett and Gurwitz, 1970). By contrast, a number of studies have failed to find significant sex differences in the infants' activity (Brownfield, 1956; Campbell, 1968; Korner *et al.*, 1968; Pratt, 1932) or in their crying (Fisichelli *et al.*, 1963; Korner *et al.*, 1968; Korner and Thoman, 1972). In the sphere of oral behavior, we noted the same dichotomy between those oral behaviors which are activity-related and those behaviors suggestive of sensitization of the mouth. We found no sex differences in the frequency or skill of hand-to-mouth coordinations or of fingersucking (Korner *et al.*, 1968; Korner and Kraemer, 1972). By contrast, we and others found more rhythmical mouthing (Korner, 1969), more reflex smiling (Freedman, 1971; Korner, 1969), more frequent quivering oscillations of the tongue during feeding (Balint, 1948) and more mouth-dominated, hand–mouth approach behavior in females than in males. The hunger- and arousal-related oral behaviors of spontaneous gross sucking and mouthing and of nutritive and non-nutritive sucking in turn fail to show any sex differences (Bridger, 1972; Dubignon *et al.*, 1969; Hendry and Kessen, 1964; Korner *et al.*, 1968). In addition to the differences suggestive of greater receptivity to certain stimuli on the part of the female, two studies suggest that the male may be endowed from birth with greater physical strength or muscular vigor (Bell and Darling, 1965; Korner, 1969).

The cumulative evidence of innate sex differences which requires both replication and further exploration does not detract from the fact that right from the start, mothers treat infants differently depending on their sex and that through development there is constant parental reinforcement of what culture considers to be sex-appropriate behavior. This and possible maturational differences may explain why Moss (1967) found sex differences in crying in infants aged three weeks which several studies of newborns have failed to show. Perhaps also, Olley's hypothesis (1971) that differential maternal behaviors may be a function of subtle sex differences in the infants may be relevant here. Possibly, the mothers' tendency to provide boys with more proximal, tactile stimulation, may, in part at least, be an inadvertent, unconscious compensatory response to the male's lesser cutaneous sensitivity.

What possibly could explain the fact that behavioral sex differences do exist at birth? The most frequently invoked explanation of sex differences in older children is that girls mature earlier than boys. (For a review of this issue as well as of sex differences of behavioral traits in general, see Garai and Scheinfeld, 1968.) During the neonatal period, medical statistics of perinatal morbidity certainly support the notion that females are less vulnerable and by inference, perhaps more mature. However, there is little reason to consider the particular behaviors in which female newborns exceed males as reflecting greater maturity on the part of the female. Also mitigating against the idea that the sex differences at birth are best explained on the basis of maturational differences is the fact that with every one of the characteristics in which sex differences have been found in neonates, there is evidence of continuity into later development of these same differences, either in direct or derivative form.

Specifically, the greater cutaneous sensitivity of the female neonate finds its counterpart in the adult female. Studies using evoked potential in response to electrocutaneous stimulation have shown shorter latencies and higher amplitudes of response in the adult female than in the male in both normal and psychiatric populations (Ikuta, 1969; Shagass and Schwartz, 1965a, 1966). Similarly, adult females showed shorter latencies and greater amplitudes of response to photic stimulation than males (Shagass and Schwartz, 1965b). As Engel *et al.* (1968) showed, shorter latencies of photic stimulation can already be detected in the newborn female, not only among Caucasian newborns, but among Negroes and Orientals as well. The male newborn's greater strength or muscular endowment as suggested by his greater capacity to lift his head and his greater tendency to engage in vigorous startles may foreshadow much of his later development which is characterized by superior physical strength to the female. Nisbett and Gurwitz's (1970) finding that female newborns are more responsive to sweet taste is not only confirmed in the greater taste sensitivity and taste discrimination of adult females (Soltan and Bracken, 1958; Pangborn, 1959), but is also amply supported by the animal literature. Consistently, female rats consume more glucose and saccharin solutions than males (Valenstein *et al.*, 1967; Wade and Zucker, 1969a).

The evidence regarding the persistence of the female's greater mouth sensitization as suggested by her more frequent rhythmical mouthing during sleep, the more frequent tongue clonus during feeding and her greater tendency in mouth-dominated approach behavior in hand–mouth contacts, is on the whole more derivative in nature. For one, female children from age one on are both more frequent and more persistent thumbsuckers than male children. This was brought out by several large-scale studies as reviewed by Honzig and McKee (1962). In discussing the possible reasons for this, which included among others, possible sex-linked differences in child rearing practices, Honzig and McKee (1962) concluded that none of these reasons were supported by conclusive evidence and that the most likely explanation for this consistent difference is that girls are more persistent thumbsuckers "because it is more pleasurable to them".

While on the whole the incidence of psychiatric developmental disturbances in the male far exceed those of the female (i.e. learning disorders, speech pathology, autism, etc.), eating disorders and other difficulties connected with the functions of the mouth are much more common in females than in males. According to a review on anorexia nervosa by Stunkard (1972), the ratio of the incidence of this condition is from 10 : 1 20 : 1 in favor of females. Stunkard and Hirsch (1972), in reviewing the literature on obesity concluded that in all the studies which have compared the sexes, a higher prevalence of obesity has been reported for women. Furthermore, once women take up smoking, they are less likely to give it up than men, according to a recent Health, Education and Welfare Report (1971).

In an even more derivative form, the female's development both normal and abnormal, seems to be characterized by more frequent residuals from what psychoanalytic theory describes as the oral phase of development. In this context, the term oral obviously takes on much larger and indirect meaning. Erikson (1950) in particular, stressed that in progressing through the ontogenetic stages of psychosexual development, the "oral-incorporative mode" colors the female's development much more than the male's, beginning in infancy through to the final stage of genitality. As a consequence, females appear to be more prone toward oral fixations and regressions than males. This is particularly validated in hysteria, a syndrome which in itself primarily affects women. Marmor (1953), for example, demonstrated that oral fixations are one of the most basic ingredients in the hysterical character. Fenichel (1945), in discussing several female patients with depression, stressed not only the importance of oral fixations in their make-up, but he also pointed out that skin-erotic fixations frequently accompany oral fixations.

Returning to the newborn, what could possibly account for the sex differences seen at birth, which, in direct or derivative form, seem to persist through much of later development? Aside from possible genetic determinants, the most plausible explanation seems to come from the field of foetal endocrinology. As Hamburg and Lunde (1966) have pointed out, the hormones responsible for the sexual differentiation *in utero* may sensitize the organism's central nervous system in such a way that sex-linked behaviors will emerge even at a later time when the circulation of these hormones is no longer detectable within the system. The principal hormones involved in sexual differentiation appear to be androgens. To become male, the undifferentiated foetus must first develop testes, which, in the human, occurs during the third foetal month. According to Levine (1971), the foetal testes must secrete first, a duct-organizing substance and second, male hormones (androgens) in order for the embryo to become male. The continued secretion of androgens from the foetal testes is essential for maleness to develop both in the anatomical and the functional sense. There is good evidence, according to Levine, that during the late prenatal period, the foetal testes exhibit a high degree of endocrine activity. The presence of circulating androgen so close to birth may possibly explain why the male exhibits signs of greater muscular strength at birth. But what could explain the cumulative evidence of the neotanal behavioral sex differences which points to greater sensitization of the perioral region and of the skin in the female? There is next to nothing in the literature which readily explains the basis of these differences. Purely speculatively, I would postulate that the prenatal circulating androgens produced by the male may act to suppress the male's perioral responsiveness and skin sensitivity. The only link supporting this speculation comes from Nisbett and Gurwitz's (1970) finding that female neonates were significantly more responsive than males to the taste of sweetness, and from animal work which assessed the hormonal basis for the consistent finding that female rats consume more glucose and saccharin solutions than males. Zucker (1969) and Wade and Zucker (1969b) found that the sex differences in saccharin intake were primarily attributable to the stimulatory influences of ovarian secretions on female taste preferences and secondarily to the suppressive effect of testicular secretions on male consumption. Possibly both types of hormonal actions may be contributory to the sex differences noted. While the foetal ovary apparently does not excrete estrogen, the female foetus may be more heavily exposed than the male to the freely circulating maternal estrogens by virtue of not producing androgens that counteract the influence of the estrogens. Also, the presence of testicular secretions by the male may have a direct suppressive effect. It may thus be the counteracting and/or suppressive action of the androgens which may account for the male's lesser interest in the taste of sweetness, and possibly also for his diminished sensory responsiveness of both mouth and skin.

SUMMARY

While there is cumulative evidence in the literature that males and females are treated differently from the start, a review of the sex differences found among neonates clearly points to innate sex differences as well. The newborn female tentatively emerges as more receptive to certain stimuli, particularly of the oral and cutaneous type. At the same time, she is no way less active or expressive, as no significant differences have been found in activity level or crying. There is suggestive evidence that the male newborn is endowed with greater muscular strength. Since the literature on adult sex differences suggests persistence, either in direct or derivative form of the sex differences found in newborns, an explanation of these differences on maturational grounds is not the most cogent. More plausibly, the hormones responsible for sexual differentiation *in utero* may account for the sex differences at birth through sensitization of the organism's CNS which will facilitate sex-linked behaviors to emerge at a later time. Possibly the androgens circulating during foetal life which are required for the foetus to become male, may be responsible for the male's greater muscular strength and may also serve to suppress his responsiveness and sensitivity of both mouth and skin.

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A TWO-FACTOR MODEL OF EMOTIONAL DISTURBANCE IN THE YOUNG CHILD: VALIDITY AND SCREENING EFFICIENCY*

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IN A PREVIOUS paper (Kohn and Rosman, 1972a) we have described two teacher rating instruments, the Problem Checklist‡ and the Social Competence Scale. These instruments were designed for use with preschool children, in contrast to instruments developed by Peterson (1961), Rutter (1967a), and Schaefer and Aaronson (1966) which focus on the elementary and preadolescent child. The purpose of the present paper is to provide evidence that the Problem Checklist and the Social Competence Scale yield valid and useful measures for the assessment of emotional disturbance in preschool children.

The two instruments measure two major dimensions of social-emotional functioning, namely:

(1) Interest-Participation vs. Apathy-Withdrawal.

(2) Cooperation-Compliance vs. Anger-Defiance.

Children high in Apathy-Withdrawal tend to be intrapunitive; children high in Anger-Defiance, extrapunitive. The former direct their hostility against themselves; the latter act it out against the world. The negative poles of the two dimensions seem to tap syndromes similar to what other investigators and clinicians have referred to as "Personality Problems" and "Conduct Problems" (Peterson, 1961).

Previous epidemiological research has relied almost exclusively on one-dimensional models of emotional health-disturbance. An important recent epidemiological study, the Midtown Project (Srole *et al.*, 1962), used as the major dependent variable a seven-point scale of emotional impairment.

There is reason to believe that the two-dimensional model advocated here has much to recommend it. There is considerable evidence to suggest that the two dimensions have differential etiology and prognoses. Hence, greater understanding, as well as more effective preventative and therapeutic programs, may result from a two-factor approach which deals with emotional disturbance in a differentiated, rather than a global way.

The two-dimensional model proposed here seems to have very wide generality. In his review article, *Classification in Child Psychiatry*, Rutter (1967b) notes:

> Of all the diagnostic distinctions made in child psychiatry, perhaps the most universal has been

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[‡] In previous publications this instrument has been referred to as the Kohn Symptom Checklist.

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> between "conduct problems" by which is meant antisocial or aggressive behavior, and "personality problems" which refer to emotional or neurotic disorders (e.g. Ackerson, 1931, 1942; Becker *et al.*, 1962; Paynter and Blanchard, 1929; Peterson, 1960, 1961). The terms are somewhat unfortunate in that there is no good reason to suppose that neurosis is much more closely related to personality than to antisocial behavior (Kanner, 1957). Nevertheless, although the terms may be somewhat misleading, the distinction between neurotic disorders and antisocial disorders has appeared in nearly all symptom cluster or factor analytic studies (Peterson, 1961; Collins *et al.*, 1962; Eysenck and Rachman, 1965), and it has been argued that if symptoms tend to correlate or "go together" they should be classified together. [p. 164]

In the present paper we will test the hypothesis that the magnitude of Factor I and II scores will vary systematically as a function of degree of emotional disturbance. After having demonstrated the validity of the instruments, we will examine with what degree of efficiency the factor scores select disturbed children in a normal Day Care population and in selected reference groups of disturbed children.

As a preliminary step it will be necessary to briefly describe the instruments and the kinds of behavior that the factor dimensions tap. Both instruments were designed to focus on overt classroom behavior; this enabled us to utilize the generally untapped resource of the teacher's knowledge of the children's functioning. The two instruments were conceived with markedly different theoretical premises. The Social Competence Scale was designed to measure the young child's mastery of the preschool environment. The Problem Checklist was designed as an inventory of behaviors indicative of clinical impairment and observable in a preschool setting.

As previously reported (Kohn and Rosman, 1972a), separate factor analyses of the two instruments showed each of them to measure two major but relatively independent dimensions of social-emotional functioning, as follows:

(1) Social Competence Scale: (a) Factor I—Interest-Participation vs. Apathy-Withdrawal, and (b) Factor II—Cooperation-Compliance vs. Anger-Defiance.

(2) Problem Checklist: (a) Factor I—Apathy-Withdrawal, and (b) Factor II—Anger-Defiance.

The Social Competence Scale covers the entire range of functioning from emotional health to disturbance; the Problem Checklist differentiates disturbance from its absence.

On the Social Competence Scale a high positive Factor I score signifies interest, curiosity, and assertiveness, while a high negative Factor I score signifies withdrawal from these opportunities, a lack of interest, and a failure to elicit the cooperation of peers in executing the play activities of the classroom.

On the Social Competence Factor II, a high positive score indicates living within the structure of the classroom and complying with teachers' requests and suggestions; a high negative score indicates defiance and creating disturbances which upset the normal classroom routines. The Factor I and II items from the Problem Checklist cover types of functioning similar to those in the corresponding negative poles of the two factors of the Social Competence Scale.*

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* In order to show what is measured by the Factors, the items included in the Social Competence Scale and in the Problem Checklist are presented in Appendix A. An administration and scoring manual is available from the senior author.

METHODOLOGY

Dependent variables

The dependent variables in the study were the factor scores from the teacher rating instruments. Each child was rated independently by the two full-time teachers in his classroom—the head teacher and one of the full-time assistant teachers. From each teacher we generated four scores, Social Competence Factors I and II and Problem Checklist Factors I and II. The corresponding scores from the two teachers were pooled. Part A of Table 1 shows the interrater reliabilities (Spearman–Brown corrected) of the four scores of the two instruments. It is evident from the two tables that the factor dimensions are measured with adequate reliability for group comparisons, screening and survey purposes but not necessarily high enough for precise clinical judgements about individual children.

TABLE 1. PSYCHOMETRIC CHARACTERISTICS OF PRESCHOOL INSTRUMENTS

N (total)	1232
N (Total subjects rated by two full-time teachers)	1110*
Part A. Estimated reliability of pooled teacher scores (Spearman–Brown corrected)	
KPC I	0·69
KPC II	0·77
KSC I	0·74
KSC II	0·76
Part B. Cross-instrument reliability of pooled teacher scores	
Corresponding factors	
KPC I vs. KSC I	−0·74
KPC II vs. KSC II	−0·82
Noncorresponding factors	
KPC I vs. KSC II	−0·22
KPC II vs. KSC I	−0·26
Part C. Estimated reliability of pooled instrument scores	
KPI I	0·83
KPI II	0·83

Note. KPC—Kohn Problem Checklist; KSC—Kohn Social Competence Scale; KPI—Kohn pooled instrument score. High KPC and KPI scores indicate disturbance; high KSC scores indicate health.

*Because of job vacancies approximately 10 per cent of the children were rated by one teacher only. In order to keep measures comparable, for these children the single teacher score was doubled. All reliability coefficients are based on those cases with two teacher ratings only.

Part B of Table 1 shows that the two major dimensions are relatively independent of each other. Because of the high correlations between the corresponding factor scores from the two instruments, the pooled teacher scores were transformed to standard scores with a mean of zero and a standard deviation of one; the scores from the corresponding factors of the two instruments were summed to generate two pooled instrument scores; namely pooled instrument Factors I and II. The estimated reliabilities of the two pooled instrument scores are shown in Part C of Table 1; they are both 0·83. Throughout the remainder of the present paper, pooled instrument scores will be used. It should be noted that a high pooled factor score indicates disturbance, a low pooled factor score indicates health.

The factor scores of eight reference groups were compared with each other. Five of the eight reference groups were derived from a 20 per cent random sample of all children attending 90 out of 92 New York City public Day Care centers of the Division of Day Care of the New York City Department of Social Services in November of 1967 ($N = 1232$). This 20 per cent random sample will be referred to as the normative sample of New York City Day Care, or briefly, the normative sample. After describing the normative sample and how five reference groups were constituted from it, we will describe the three reference groups outside of the normative sample—to be referred to as the independent reference groups.

Normative sample of New York City Day Care

A detailed description of this sample has been previously presented (Kohn and Rosman, 1972*a*). In brief, these children came from lower and lower-middle class backgrounds. Of the sample, 56 per cent were black; 27 per cent, white; and 16 per cent, Puerto Rican. Of the children, 50 per cent came from broken homes, mostly due to father absence. High school had not been completed by 45 per cent of the mothers; 45 per cent of the families had incomes below $4500 and 19 per cent received Welfare assistance. A large proportion of the children came from relatively deprived backgrounds. The children ranged in age from 36 to 70 months.

Reference groups in the normative sample

To constitute the reference groups, the children were rated on two scales, a scale of global functioning and a referral rating scale. The global functioning rating —on a three-point scale—was done independently by the two full-time teachers in the classroom. The definitions of the three scale points were as follows:

(1) *Well functioning*. A child who gets along well with teachers and other children, participates with interest in activities, and is able to accomplish the tasks that are usually mastered by children his age. He appears alert, self-sufficient, friendly, and unafraid.

(2) *Moderately well functioning*. A child who functions fairly adequately but who shows some difficulty in one or several areas. He might be characterized as a child for whom growing up represents something of a struggle and as a child who is not as happy as he might be.

(3) *Poorly functioning*. A child who is having more difficulty than most children of his age in functioning in the school setting. Poor functioning might manifest itself in many different ways, such as; (a) problems in getting along with teachers and adults, (b) difficulties in relating to other children, or (c) lack of ability to sustain any prolonged interest. In summary, a child who, in comparison to others in the group, presents problems and exhibits signs of disturbance.

These ratings from the full-time teachers were also pooled. These pooled global ratings had a range from 2 to 6. The interrater reliability of these pooled ratings (Spearman–Brown corrected) was 0·82.

The referral scale was completed by the head teachers only, since it is generally their responsibility to bring referral needs to the Day Care director's attention. For the referral rating the teacher indicated whether; (a) the child was receiving psychological or psychiatric treatment or a referral for such treatment would be indicated, (b) the child was receiving remedial or special (non-medical) help or a referral for remedial help was indicated, and (c) no referral was necessary.

Reference groups in Day Care sample

The global and referral ratings were the basis of the five reference groups in the normative sample. The reference groups were constituted separately for males ($N = 628$) and females ($N = 604$).

(1) *Well functioning group.* Children who were not in treatment or in need of treatment and were rated by both Day Care teachers as *well functioning;* i.e. had a pooled score of global functioning of 2 ($N = 175$ males, 244 females).

(2) *Moderately well functioning group.* Children who were not in treatment or in need of treatment and were rated by both Day Care teachers as *moderately well functioning* or by one teacher as *moderately well functioning* and by the other as *well functioning*; i.e. had a pooled score of global functioning of 3 or 4 ($N = 288$ males, 237 females).

(3) *Poorly functioning group.* Children who were not in treatment or in need of treatment and were rated by both Day Care teachers as *poorly functioning* or by one teacher as *poorly functioning* and by the other as *moderately well functioning*; i.e. had a pooled score of global functioning of 5 or 6 ($N = 39$ males, 32 females).

(4) *Remedial group.* Children in remedial treatment (e.g. speech disorders) or children needing such treatment in the opinion of the head teacher ($N = 52$ males, 45 females).

(5) *Therapy group.* Children in psychological or psychiatric treatment or children needing such treatment in the opinion of the head teacher ($N = 74$ males, 46 females).

The first two groups—the Well and Moderately Well Functioning Groups—may be considered essentially healthy, although we expected the Well Group to be, on the average, somewhat healthier than the Moderately Well Group. The last three groups—the Poor, Remedial, and Therapy Groups—may be considered disturbed. This amounts to a criterion of disturbance, as being in need of treatment and/or rated by at least one teacher as *poorly functioning.* By these criteria of disturbance, 26·3 per cent of the males and 20·3 per cent of the females in our normative sample were disturbed.

Conclusions based on these reference groups alone must be interpreted cautiously because of the criterion ratings of global functioning and need for treatment were made by the same teachers who completed the Social Competence Scale and the Problem Checklist. Therefore, we additionally studied three independent reference groups: a Director-Referred Group, a Therapeutic Day Treatment Group, and a Mental Hospital Group.

Independent reference groups

Teachers of the children in the independent reference groups also completed the Social Competence Scale and Symptom Checklist. In addition, the children in one of the groups—the Mental Hospital Group—were rated by ward personnel; their ward personnel and teacher rating scores were pooled and prorated for the number of raters.

(1) *Director-Referred Group.* We asked the directors of each of the 90 Day Care centers participating in the project to designate any children who had a sufficiently large problem to require outside help (nonmedical), had been referred for such help, or were actually receiving treatment. They also rated the severity of the children's problems on a four-point scale ranging from *minor* to *very severe*. Some of the children in the Director-Referred Groups ($N = 39$) were already in our normative sample. Parents of Director-Referred children not already in the normative sample were contacted for permission to include the Director-Referred children in our reference group study.

Director-nominated children were rated by their classroom teachers on the Problem Checklist and the Social Competence Scale. To avoid placing too great a burden on any one center, we elected to study no more than two new Director-Referred children in each center. In contacting the parents for permission, we attempted to obtain those subjects in each center with the most severe problems. A total of 119 subjects comprise the Director-Referred Group, and 80 of them were new to the study ($N = 81$ males, 38 females).

We have indicated above that it is generally the Head teacher's responsibility to bring referral needs to the Day Care director's attention. However, the Day Care director draws on other sources of information about the child, primarily their own observation of the child in the classroom and their conferences with the parents. To the extent that teachers do bring children's problems to their attention, the Director-nominated children cannot be considered a completely independent reference group. This criticism does not apply to the other two reference groups designated as independent.

(2) *Therapeutic Day Treatment Group.* The cooperation of three local therapeutic day nurseries was obtained, and (with the consent of the parent) data similar to that available for the normative sample were obtained. The *total population* of children age 7 or less enrolled in these facilities at the time of the study ($N = 44$; $N = 31$ males, $N = 13$ females) were included in the sample. All of these children were placed because of psychiatric disorders; all of them were enrolled on the basis of psychiatric recommendations. Children in these schools generally have problems so severe that they are unable to function in the ordinary Day Care or nursery settings. Psychiatric data forms were completed; on the basis of diagnoses available in the records, 23 were judged to have severe emotional disturbance accompanied by mental retardation; 6, to be principally schizophrenic; and 15, to be autistic.

(3) *Mental Hospital Group.* The cooperation of a local mental hospital was also obtained. Children enrolled in this hospital suffered psychiatric disorders and were hospitalized on the basis of psychiatric recommendation. The *total population* of children age 7 or less hospitalized at the time of the study ($N = 30$; $N = 23$ males,

N = 7 females) were included. Data similar to that available for the normative sample were obtained. In addition, hospital personnel completed a psychiatric data sheet. Of the subjects in this goup, 5 were judged to have severe emotional disturbance accompanied by mental retardation; 19, to be principally schizophrenic; and 5, to be autistic (1 of the subjects had incomplete data).

The *N*s in Day Treatment and Mental Hospital groups are smaller than the *N*s in the other reference groups. This is due to the fact that in the population at large there are very few children ages 7 or less who are institutionalized for psychiatric reasons or who receive day care therapeutic care.

Demographic-background data

These are presented in Table 2 for the, (a) normative sample, (b) disturbed group in the normative sample, and (c) three independent reference groups.

TABLE 2. SELECTED BACKGROUND VARIABLES FOR NORMATIVE SAMPLE AND FOR REFERENCE GROUPS

Background variables	Normative sample	Disturbed groups in normative sample	Director-Referred	Therapeutic Day Treatment	Mental Hospital
N	1232	288	119	44	29
Mean age at rating (in months)	54	54	60	75	68
Standard deviation of age	9·3	9·3	9·3	12·2	7·5
% Male	51·0	56·7	67·2	70·5	76·7
% Intact homes	49·6	44·3	41·4	88·4	65·6
% Race					
Negro	55·8	52·8	55·7	17·1	25·9
Puerto Rican	15·6	16·4	27·8	00·0	11·1
White	27·0	28·7	14·8	82·9	63·0
Other	1·5	2·1	1·7	00·0	00·0
Median income ($)	5300	5000	4800	8000+	6300
Mean mother's education (yr)	12	12	12	12	11

The disturbed group in the normative sample is similar to the entire normative sample in all respects except for sex composition and intactness of home. The disturbed group has significantly more males and significantly fewer children from intact homes.

The three independent reference groups differ among each other, from the disturbed group in the normative sample, and from the entire normative sample, in many respects. All three have very high, though varying, percentages of males; since the data will be presented separately by sex, these varying sex ratios are not important for present purposes. The groups further differ in mean age, intactness of home, racial and ethnic composition, and social class as reflected by income and occupation.

The correlations in the normative sample of Day Care children between age, racial and ethnic background, intactness of home, social class and pooled instrument Factor I and II scores are presented in Table 3. The findings confirm our previous results (Kohn and Silverman, 1967) to the effect that the amount of variance in factor scores by these background-demographic variables is small. It is particularly noteworthy that whites, blacks and Puerto Rican children do not differ among each other *at this age level* on these measures of social-emotional functioning.

The only significant differences are with sex (boys are significantly higher, i.e. disturbed on Factor II than girls); with age, (older children are slightly lower, i.e. less disturbed than younger children on Factor I); with Intactness (children from broken homes are higher, i.e. more disturbed on Factor II) and with Income (children from more well-to-do families are less disturbed on both Factor dimensions). We felt that the magnitude of these correlation coefficients warranted analyzing the data separately by sex, but that the magnitude of the remaining correlation coefficients was not sufficiently high to warrant further breakdowns of the data.

TABLE 3. CORRELATIONS OF BACKGROUND-DEMOGRAPHIC VARIABLES WITH POOLED INSTRUMENT FACTORS I AND II IN THE NORMATIVE SAMPLE IN DAY CARE $N > 1000$

	KPI-I	KPI-II
Sex (Male =1, Female=2)	−0·06	−0·18***
Age at Rating	−0·06**	0·01
Ethnic Background		
Negro vs. Others (N=1, Others=2)	−0·01	0·03
Puerto Rican vs. Others (PR=1, Others=2)	0·00	0·01
White vs. Others (White=1, Others=2)	−0·01	0·02
Intactness of Home		
(Both parents present=1, broken=2)	−0·04	0·11**
Social Class		
Occupation of Head of Household	−0·04	−0·03
Income	−0·07**	−0·10**

p values: $^{**}p \leq 0{\cdot}01$; $^{***}p \leq 0{\cdot}001$.

Connors' (1970) findings agree with these results; the two major factors (from a six-factor rotation) which he calls "Aggressive-Conduct Disorder" and "Anxious-Inhibited" and which seem to be similar to our factor dimensions were uncorrelated with age, social class, or race.

The results suggest that even though the reference groups differ from each other in major background-demographic variables, none of the correlations between the factor scores are sufficiently high to complicate interpretation of the findings.

Hypothesized factor scores of the reference groups

We hypothesized the relative standing of the groups to be as follows:

(1) Proceeding from the Well to the Moderately Well and then to the Poorly Functioning Groups in the normative sample, we expected to find increasingly higher degrees of pathology; i.e. increasingly higher factor scores.

(2) The children in the three "disturbed" groups of the Day Care sample (Poorly Functioning, Remedial, and Therapy) would be higher on the factor scores than the two "healthy" groups (Well and Moderately Well).

(3) Of the three disturbed groups in the normative sample, we expected the Therapy Group to have higher factor scores than the Poor or Remedial Treatment Groups. We felt that when a child is perceived as a candidate for referral, he very likely presents a more serious problem in the classroom than a child who is "merely" seen as poorly functioning. In a previous study (Kohn, 1968) we found that depending on the criteria used, 16–30 per cent of 407 Day Care children were disturbed; only 2 per cent, however, were referred for treatment and only one child actually found his way into treatment. Because of the high threshold for referral, we expected that only the most disturbed children would be in the Therapy Group. We were not sure of the relative standing of the Remedial Group. These children usually have a specific and circumscribed problem; e.g. a speech disorder. We could not be sure to what extent this circumscribed type of problem might be symptomatic of more pervasive social-emotional impairment.

(4) We expected all three independent reference groups to be higher on both Factor I and Factor II scores than the two healthy Day Care groups.

(5) We expected the Director-Referred Group to be similar in Factor I and II scores to the Therapy Group or possibly somewhat higher, for two reasons; (a) for a child to come to the attention of the director, he may be somewhat more disturbed, particularly on Factor II (Anger-Defiance); and (b) in order not to unduly burden the teachers who would be doing the ratings, we picked a maximum of only two new cases, and we picked those who had been rated as *extreme* by the directors.

(6) We expected the Therapeutic Day Nursery and Mental Hospital Groups to have higher scores than all of the other reference groups. Both groups of children were unable to function in normal community facilities, and one, the Mental Hospital Group, apparently was so disturbed as to be removed from the community completely.

(7) For this same reason we expected the Mental Hospital Group to be more disturbed than the Therapeutic Day Nursery Group.

In summary, we expected that children judged to be disturbed would show significantly and substantially higher scores on Factor I and/or Factor II than children judged to be healthy. Furthermore, we expected increasingly higher values in the factor scores as we proceeded from the least to the most disturbed groups of children.

RESULTS

Table 4 shows the means and standard deviations of the pooled instrument scores for the entire Day Care sample and the eight reference groups, separately for males and females. Note that for the entire normative sample the means are close to zero and the standard deviations, close to two. As noted above, mean factor scores below zero are in the direction of health, and mean factor scores above zero are in the direction of pathology.

TABLE 4. MEANS AND STANDARD DEVIATIONS FOR EIGHT REFERENCE GROUPS

Sex and group	*N*	Means I	Means II	Standard deviations I	Standard deviations II
Male					
Normative group	628	0·12	0·33	1·83	1·99
Day Care reference groups					
Well	175	−1·41	−0·98	0·98	1·18
Moderately Well	288	0·15	0·16	1·70	1·57
Poor	39	2·17	2·04	1·48	2·27
Remedial Treatment	52	1·22	1·52	2·39	2·06
Therapy	74	1·76	2·38	1·97	3·17
Independent reference groups					
Director-Referred	81	1·02	2·31	1·69	2·48
Therapeutic Day Treatment	31	3·05	2·53	1·95	1·31
Mental Hospital	23	2·08	1·69	1·82	1·70
Female					
Normative group	604	−0·12	−0·34	1·88	1·77
Day Care reference groups					
Well	244	−1·46	−1·05	0·93	1·23
Moderately Well	237	0·28	−0·31	1·42	1·33
Poor	32	2·05	0·58	1·97	1·82
Remedial Treatment	45	1·24	0·47	2·03	2·23
Therapy	46	2·03	1·84	2·05	2·82
Independent reference groups					
Director-Referred	38	0·94	1·09	1·97	2·55
Therapeutic Day Treatment	13	2·90	1·97	1·99	1·58
Mental Hospital	7	1·52	2·62	1·82	1·42

Table 5 shows the statistical significance of differences among Factor I means, and among Factor II means, separately for males and females. The tests of significance were carried out by means of the *Quick Test* (Cohen and Cohen, 1971), a rapid-scoring but close approximation of the *t*-test. In our calculations we used the standard deviation from the larger group and the *N* from the smaller group. Using this procedure, the *Quick Test* underestimates the significance; comparisons which may be of borderline significance may be significant when the exact *t* value is calculated.

A number of trends are clearly evident in the data.

(1) The means of both male and female Well Groups are substantially below zero on both factor dimensions. Because of the curvilinear relation between Social Competence and Problem Checklist scores, we can be certain that the children in the Well Group do not simply show absence of symptoms, but show positive mental health (see Kohn and Rosman, 1972a). The means of the Moderately Well Groups of both sexes are close to the overall mean of the Day Care sample; namely zero. Table 5 shows that for both sexes and both factor scores all groups are significantly more disturbed than the Well Group; furthermore, for both sexes and both factors, all groups (with one exception) are significantly more disturbed than the Moderately Well Group. In other words, the mean factor scores of the disturbed groups are significantly higher than the mean factor scores of the two healthy groups.

(2) The means of the disturbed male groups are high on both factor dimensions, i.e. disturbed males tend to be high in Apathy-Withdrawal as well as in Anger-Defiance. The female disturbed groups show a different pattern; all score high on Factor I (Apathy-Withdrawal), but only some show high Factor II means.

(3) The disturbed groups do not show the progression of successively higher means that we had postulated. The four disturbed groups which show the most clear-cut differences from the two healthy groups and which have the highest factor scores are the Poorly Functioning, Therapy, Therapeutic Day Treatment, and Mental Hospital Groups. They did not, however, systematically differ from each other, as predicted.

As expected, the Remedial Groups of both sexes were significantly more disturbed than the Well and Moderately Well Groups in both Apathy-Withdrawal and Anger-Defiance. They were also less disturbed than the Poor, Therapy, Therapeutic Day Nursery, and Mental Hospital Groups of both sexes; most, but not all of these differences, were significant.

Contrary to expectation, the Director-Referred Group was very similar to the Remedial Group, except for Factor II scores for males. The Director-Referred Group was significantly more disturbed than the two healthy groups. On the other hand, with the exception of the male Factor II mean noted above, it was significantly less disturbed than the remaining disturbed groups. In retrospect, it seems plausible to assume that since directors have less direct contact with the children than the teachers, the judgment of the directors may be less valid.

Two issues require further attention; (a) the reference groups do not show the predicted sequence, and (b) boys and girls do not show the same patterns of disturbance.

Male–female differences

With one exception, the disturbed groups of boys have Factor I and II scores that are high and roughly equal; none of the differences (*t*-test for correlated means) are significant. The exception is the Director-Referred Group, whose Factor II mean is significantly higher than its Factor I mean ($t = 4{\cdot}24$, $p < 0{\cdot}005$).

The girls, however, show a different pattern. The three groups of disturbed girls in the normative sample have elevated Factor I scores; only the girls in the Therapy Group are high on both Factors I and II, and their factor scores are not significantly different from each other ($t = 0{\cdot}75$, $p < 0{\cdot}20$). On the other hand, for the two groups not in such treatment (Poor and Remedial Groups) the Factor I scores are significantly higher than the Factor II scores ($t = 2{\cdot}34$, $p < 0{\cdot}02$ and $t = 2{\cdot}00$, $p < 0{\cdot}05$). This suggests that girls who are disturbed show predominantly Factor I pathology; only girls who show Factor II pathology alone or in combination with Factor I pathology, however, are likely to be referred for treatment of their personality disturbances. This is further supported by two of the independent reference groups. Both the Therapeutic Day Treatment and the Mental Hospital girls scored high (mean factor score of 1·5 or above) on both Factor I and Factor II. These data suggest that girls in treatment are not representative of all disturbed girls. If a girl is high on both Factor I and Factor II pathology or on Factor II pathology only, her chances of being considered for treatment or of entering it are much higher than if she is high on Factor I pathology only.

Progression of disturbed groups

Allowing for the male–female differential indicated above, the reference groups showing the highest pathology scores are the Poor and Therapy Groups in the Day Care sample and the Therapeutic Day Treatment and Mental Hospital Groups in the independent reference groups. For these groups the mean Factor I and II scores are in the area of two.

It is surprising that the children in the two independent reference groups, who are so deviant that they cannot be enrolled in normal community facilities (and, in the case of the Mental Hospital Group, cannot be maintained in the community), were not strikingly different from the Poorly Functioning or Therapy Groups in Day Care.

One explanation may be that the Mental Hospital children and Day Treatment children are, in fact, more disturbed, but the frame of reference of the Mental Hospital and Day Treatment personnel may differ from the frame of reference of the Day Care teachers. Because of their continuous contact with disturbed children, these teachers may become adapted to severe disturbance and not rate instances of disturbance as harshly as Day Care teachers whose frame of reference is heavily influenced by the large number of relatively well functioning children they encounter every day.

It is also surprising that the two very disturbed groups in the normative sample, namely the Poorly Functioning groups and the Therapy groups, were not more different from each other. As noted above there is a difference for girls but not boys; only if a girl is high in Factor II pathology alone or in combination with Factor I will she be referred for treatment. For boys, we cannot detect any such differential.

For boys, the two Poorly Functioning and Therapy groups are high and roughly equal in their Factor scores. This suggests that at least for boys it is not solely the magnitude of the problem that the child presents in the classroom that leads to referral for therapeutic intervention. There must be other characteristics, undetected by the instruments, which in combination with high Factor scores leads to referral.

In summary, while the analysis of the reference groups has not yielded the expected gradation between the disturbed groups, the children in the disturbed groups are substantially different from the children in the Well Functioning and Moderately Well Functioning Groups. Deviation from the predicted sequence may be accounted for in part by sex differences and frame of reference effects. Nevertheless, the finding that the disturbed groups, particularly the independent reference groups, differ significantly from the healthy groups is a positive indication of the validity of the instruments.

Detection of disturbed children

In this section we will attempt to determine how efficiently Factor I and II scores detect the disturbed children in the reference groups. As an approach to this problem, we have adopted two concepts—selectivity and predictive range—which Stott (1960) found useful in his work on delinquency prediction. "Selectivity" refers to the proportion of all cases who are identified as positives who are true positives, and "predictive range" refers to the proportion of all true positives in the sample who have been spotted. As Stott points out:

> The higher the [degree of] selectivity, the smaller the range, and conversely. In other words a high score criterion will pick out few among the total number of delinquents, but nearly all will be correctly picked; on the other hand, a low score criterion will embrace a good percent of the delinquents' total but include a large number of non-delinquents. The test of the practical value of any instrument is whether it can strike a compromise criterion which will serve to detect, say, the majority of future delinquents, without having an unwieldy number of non-delinquents also in the bag. [p. 195]

It should be noted again that the application of these concepts to the normative sample must be viewed cautiously because of criterion contamination—the same teachers who rated the children on the Social Competence Scale and the Problem Checklist also made judgments of the children's global functioning and of their need for treatment. However, application of the concepts to the independent reference groups should yield unambiguous evidence.

For the construction of the range and selectivity tables the three disturbed groups in the normative sample were combined into a "disturbed" group and the two healthy groups were combined into a "healthy" group. This was done for males and females separately. These data, for Factor I, Factor II, and Factor I and II jointly, are presented in Tables 6 and 7.

The tables show cumulatively, by one standard deviation steps, the number of cases in the disturbed and healthy groups separately; the total number of cases in the disturbed and healthy groups combined (N); the proportion of the total sample scanned (p); as well as the range and selectivity values. For example, in the table presenting the data on males at two standard deviations and above on Factor I (Apathy-Withdrawal), there are a total of 34 cases, 33 of whom are disturbed and

1 of whom is not. At and above this standard deviation point lie 5·4 per cent of the total sample, and 20 per cent of the disturbed children in the sample have been detected; furthermore, 97·1 per cent of those whom we have identified as disturbed are true positives.

TABLE 6. SELECTIVITY* AND RANGE† VALUES OF MALES IN NORMATIVE SAMPLE (N=628)

	Standard deviation steps						
	4 and above	3·99 to 3	2·99 to 2	1·99 to 1	0·99 to 0	−0·01 to −1	−1·01 to −2
Factor I							
Cumulative N							
Disturbed	1	6	33	75	128	160	165
Healthy	0	0	1	28	163	390	463
Total	1	6	34	103	291	550	628
Cumulative p	0·002	0·010	0·054	0·164	0·463	0·874	1·000
Range	0·006	0·036	0·200	0·455	0·776	0·970	1·000
Selectivity	1·000	1·000	0·971	0·728	0·440	0·291	0·263
Factor II							
Cumulative N							
Disturbed	1	9	37	80	133	165	165
Healthy	0	0	5	50	175	408	463
Total	1	9	42	130	308	573	628
Cumulative p	0·002	0·014	0·067	0·207	0·490	0·911	1·000
Range	0·006	0·055	0·224	0·485	0·806	1·000	1·000
Selectivity	1·000	1·000	0·881	0·615	0·432	0·288	0·263
Factor I & II							
Cumulative N							
Disturbed	2	12	64	123	159	165	165
Healthy	0	0	6	76	265	443	463
Total	2	12	70	199	424	608	628
Cumulative p	0·003	0·019	0·095	0·317	0·674	0·967	1·000
Range	0·012	0·073	0·388	0·745	0·964	1·000	1·000
Selectivity	1·000	1·000	0·914	0·618	0·375	0·271	0·263

* Selectivity—proportion of true positives correctly chosen.

† Range—proportion of all true positives in the sample.

In order to determine optimal cut-off points for screening purposes, the selectivity and range data are plotted in 0·5 standard deviation steps, separately for males and females, in Figs. 1 and 2.

The height of the intercept between corresponding range and selectivity curves is a rough index of the extent to which the scale discriminates the disturbed from the healthy groups. For males on Factor I (Apathy-Withdrawal) and also on

TABLE 7. SELECTIVITY* AND RANGE† VALUES OF FEMALES IN NORMATIVE SAMPLE (*N*=604)

	Standard deviation steps						
	4 and above	3·99 to 3	2·99 to 2	1·99 to 1	0·99 to 0	−0·01 to −1	−1·01 to −2
Factor I							
Cumulative *N*							
Disturbed	1	7	23	52	101	121	123
Healthy	0	0	3	33	140	390	481
Total	1	7	26	85	241	511	604
Cumulative *p*	0·002	0·012	0·043	0·141	0·399	0·846	1·000
Range	0·008	0·057	0·187	0·423	0·821	0·984	1·000
Selectivity	1·000	1·000	0·885	0·612	0·419	0·237	0·204
Factor II							
Cumulative *N*							
Disturbed	1	4	21	41	64	117	123
Healthy	0	0	3	23	127	390	481
Total	1	4	24	64	191	507	604
Cumulative *p*	0·002	0·006	0·040	0·106	0·316	0·840	1·000
Range	0·008	0·033	0·171	0·333	0·520	0·951	1·000
Selectivity	1·000	1·000	0·875	0·641	0·335	0·231	0·204
Factor I & II							
Cumulative *N*							
Disturbed	2	11	42	75	108	123	123
Healthy	0	0	6	55	217	443	481
Total	2	11	48	130	325	566	604
Cumulative *p*	0·003	0·018	0·079	0·215	0·538	0·937	1·000
Range	0·016	0·089	0·340	0·610	0·878	1·000	1·000
Selectivity	1·000	1·000	0·875	0·577	0·332	0·217	0·204

* Selectivity—proportion of true positives correctly chosen.

† Range—proportion of all true positives in the sample.

Factor II (Anger-Defiance) the intercept is at 0·6 standard deviations and 60 per cent, which means that a criterion score of 0·6 standard deviations selects a group of children that includes 60 per cent of all the true positives; i.e. disturbed children in the normative sample. The intercept on Factor I and/or Factor II combined, however, is at 1·2 standard deviations and 67 per cent. This score identifies 67 per cent of the disturbed children in the total sample; and, of the children scoring at 1·2 standard deviations or higher, 67 per cent are disturbed. Since 32 per cent of the males in our sample score at one standard deviation or more on Factor I or II or both (see Table 6), intervention to help 67 per cent of the disturbed boys in the Day Care population would need to be aimed at only 32 per cent of the total population of males.

As seen in Fig. 2, the intercept point of females on Factor I and/or II is slightly lower than for males, one standard deviation and 59 per cent. In order to reach 59 per cent of the disturbed girls in a therapeutic program, only 22 per cent of the total sample need to be dealt with.

Since, on *a priori* grounds, our sample of New York City Day Care children

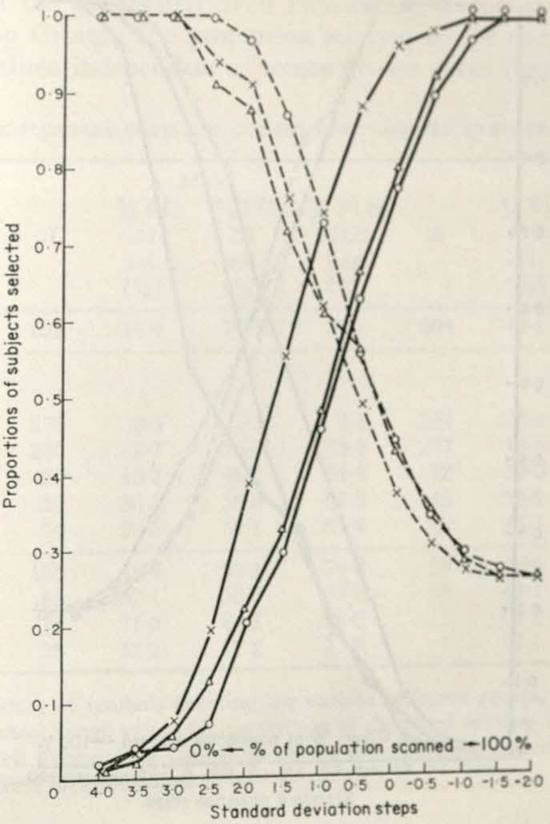

FIG. 1. Range and selectivity curves for male subjects in the normative sample (N=628).

Note. Scores above the mean indicate disturbance; scores below the mean indicate health. O—O Range curves for subjects selected by Factor I only; 0- -0 Selectivity curves for subjects selected by Factor I only; △—△ Range curves for subjects selected by Factor II only; △--△ Selectivity curves for subjects selected by Factor II only; ×—× Range curves for subjects selected by stated cut-offs on either Factor I or Factor II; ×--× Selectivity curves for subjects selected by stated cut-offs on either Factor I or Factor II.

might be expected to show higher rates of disturbance than the wider population of preschool children, it seems possible that an even smaller proportion of the wider population would need to be scanned in order to identify a given percentage of disturbed children. Contrary arguments can be presented, however, since we have noted previously that the scales seem to be sensitive to frame of reference effects.

The higher intercept on the *combined* Factor I and/or Factor II selectivity and range curves, as compared to Factor I or Factor II alone, shows the relatively greater efficiency of a two-factor model, as compared to a one-factor model of disturbance.

Since the combined Factor I and/or Factor II intercept is 1·2 for boys and 1·0

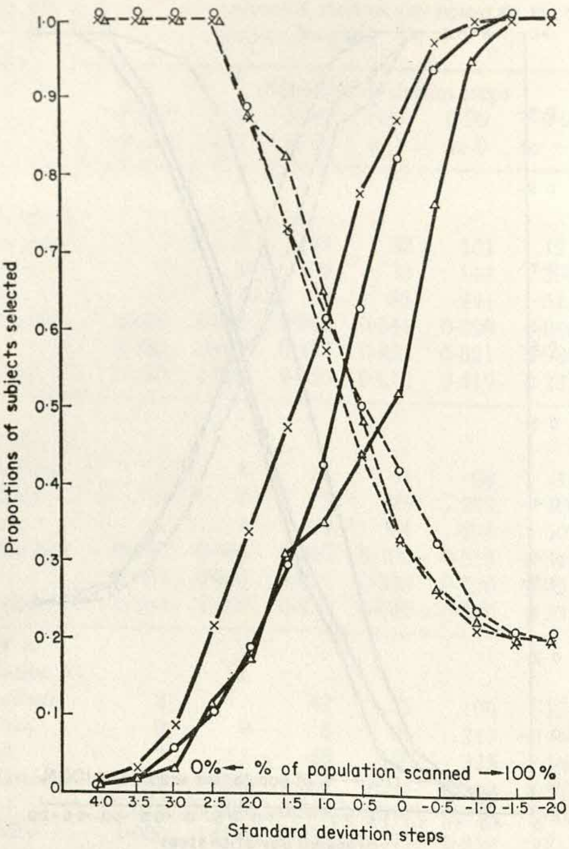

FIG. 2. Range and selectivity curves for female subjects in the normative sample ($N=604$).

Note. Scores above the mean indicate disturbance; scores below the mean indicate health. O—O Range curves for subjects selected by Factor I only; 0- -0 Selectivity curves for subjects selected by Factor I only; △—△ Range curves for subjects selected by Factor II only; △- -△ Selectivity curves for subjects selected by Factor II only; ×—× Range curves for subjects selected by stated cut-offs on either Factor I or Factor II; ×- -× Selectivity curves for subjects selected by stated cut-offs on either Factor I or Factor II.

for girls, it will be convenient to use the one standard deviation intercept in further discussion. It is also recommended as a cut-off point for any future work.

Application of one standard deviation criterion to the reference groups

In Table 8 the one standard deviation cut-off point is applied to the eight reference groups.

For each sex and for each reference group separately, the percentage of cases above the one standard deviation criterion is shown. For the males, the percentages selected by the one standard deviation cut-off on Factor I and/or II in the two healthy groups are 2 and 25 per cent, respectively, which means that 98 and 75 per cent are correctly identified as not disturbed; for the three disturbed groups in Day Care, the proportion of all true positives identified varies from 63 to 82 per cent. Note that of the subjects who are false positives by our criterion of disturbance, most (72) are in the Moderately Well Functioning Group and only 4 are in the Well Functioning Group. The proportion selected by the one standard deviation criterion in the three independent reference groups varies from 68 to 94 per cent.

TABLE 8. ONE STANDARD DEVIATION CUT-OFF POINT APPLIED TO EIGHT REFERENCE GROUPS

Groups	Males				Females			
	N	% FI ≥1 s.d. (%)	% FII ≥1 s.d. (%)	% FI or FII≥ 1 s.d. (%)	*N*	% FI ≥1 s.d. (%)	% FII ≥1 s.d. (%)	% FI or FII≥ 1 s.d. (%)
Normative	628	16·4	20·7	31·7	604	14·1	10·6	21·5
Day Care Reference								
W	175	0·0	2·3	2·3	244	0·4	2·0	2·4
MW	288	9·7	16·0	25·0	237	13·5	7·6	20·7
P	39	48·7	46·2	74·3	32	50·0	28·1	65·6
RT	52	36·5	36·5	63·5	45	33·3	28·9	48·9
T	74	50·0	58·1	82·4	46	45·7	41·3	69·6
Independent	135	44·4	54·1	74·8	58	50·0	51·7	70·0
D-R	81	32·1	50·6	67·9	38	42·1	44·7	63·2
TDT	31	71·0	64·5	93·6	13	69·2	53·9	84·6
MH	23	52·2	52·2	73·9	7	57·1	85·7	85·7

Note. For explanation of symbols denoting the various reference groups, see Table 4. Columns labelled %≥1 s.d. show range value; i.e. percentage of disturbed subjects identified. For the Well and Moderately Well Functioning Groups these are incorrect identifications; for the remaining groups these are correct identifications.

For the females the percentages selected by the one standard deviation cut-off on Factor I and/or II in the two healthy groups are 3 and 21 per cent, respectively; i.e. 97 and 79 per cent are correctly identified as not disturbed. Again, false positives are mostly in the Moderately Well Functioning Group. For the three disturbed groups in Day Care the proportion of the total number of true positives selected varies from 49 to 70 per cent. The proportion selected by the one standard deviation criterion in the three independent groups varies from 63 to 86 per cent.

The percentage of girls selected by the one standard deviation Factor I and/or II criterion is lower, particularly for the disturbed groups in Day Care, than the percentage of boys selected by this criterion. As Table 8 shows, this seems to be due primarily to the lower amount of Factor II pathology in girls.

For both sexes Table 8 clearly reveals the larger proportion of cases spotted in each of the reference groups when both Factor I and II criteria are simultaneously applied, as compared to the application of only one of the factor dimensions. This illustrates further one of the advantages of the two-factor approach. When the two factors are applied simultaneously, a high proportion of cases at risk are spotted, yet the information pertaining to whether a given case suffers from Factor I or Factor II pathology is retained.

Data on the three independent reference groups are presented in greater detail, since these groups do not suffer from criterion contamination (see Table 9). For the males separately and the females separately cumulative p values were obtained at standard deviation intervals over the total distribution. The table shows vividly how, proceeding from the extreme pathological end of the disturbed dimension to the one standard deviation point, a very high proportion of both male and female children in these three groups are identified. These figures offer reasonable support for the validity of the instruments and the selection procedures described here.

TABLE 9. RANGE DATA: INDEPENDENT REFERENCE GROUPS

Standard deviations	Males D-R	Males TDN	Males MH	Males Total	Females D-R	Females TDN	Females MH	Females Total
Factor I								
4	—	—	—	—	—	—	—	—
3	—	0·097	0·043	0·029	—	0·077	—	0·017
2	0·074	0·419	0·130	0·162	0·079	0·385	0·143	0·155
1	0·321	0·710	0·522	0·444	0·421	0·692	0·571	0·500
0	0·679	0·936	0·870	0·770	0·605	0·846	0·714	0·672
−1	1·000	1·000	1·000	1·000	0·895	1·000	1·000	0·931
−2	—	—	—	—	1·000	—	—	1·000
Factor II								
4	—	—	—	—	0·026	—	—	0·017
3	0·111	0·032	—	0·074	0·026	—	—	0·017
2	0·272	0·226	0·087	0·229	0·105	0·154	0·143	0·120
1	0·506	0·645	0·522	0·541	0·447	0·539	0·857	0·517
0	0·778	1·000	0·783	0·829	0·553	0·923	0.857	0·655
−1	0·975	—	1·000	0·985	0·974	1·000	1·000	0·982
−2	1·000	—	—	1·000	1·000	—	—	1·000
Factor I & II								
4	—	—	—	—	0·026	—	—	0·017
3	0·111	0·129	0·043	0·104	0·026	0·077	—	0·034
2	0·333	0·548	0·217	0·363	0·158	0·385	0·286	0·224
1	0·679	0·936	0·739	0·748	0·632	0·846	0·857	0·700
0	0·914	1·000	0·957	0·941	0·816	1·000	0·857	0·862
−1	1·000	—	1·000	1·000	0·974	—	1·000	0·982
−2	—	—	—	—	1·000	—	—	1·000

Note. D-R—Director-referred group; TDN—Therapeutic day nursery group; MH—Mental hospital group.

DISCUSSION

The major findings of the study are:

(1) Groups of children constituted on bases of teachers' ratings of level of functioning and of need for referral can be discriminated by means of the Social Competence Scale and Problem Checklist.

(2) The instruments differentiate between children given favorable ratings by their teachers from children assigned to various treatment groups (therapeutic day nurseries and a mental hospital).

(3) Plotting range and selectivity data of the normative Day Care group and the independent reference groups tend to substantiate our hypothesis that the two-factor model with which we are dealing discriminates; (a) children considered well functioning from children considered poorly functioning or in need of treatment, and (b) children considered well functioning from children assigned to various treatment groups (therapeutic day nurseries and a mental hospital).

Our previous research has shown a consistent correlation between sex and Anger-Defiance, but not Apathy-Withdrawal (Kohn and Silverman, 1967). Therefore, the sex differences in the current study were not unexpected. Our findings indicate that emotionally disturbed boys are high on either Apathy-Withdrawal or Anger-Defiance or both. Disturbed girls not referred for psychological or psychiatric treatment tend to score high primarily on Factor I (Apathy-Withdrawal). Girls in psychological or psychiatric treatment and girls in therapeutic community facilities (Day Treatment and Mental Hospital), however, tend to be high on either or both factor dimensions. These findings suggest that Apathy-Withdrawal, as well as Anger-Defiance, is a predominant pattern of disturbance in boys. Apathy-Withdrawal is the predominant symptom pattern in girls; however, if a girl is high on Apathy-Withdrawal and Anger-Defiance or Anger-Defiance alone, not only is she considered disturbed, but she is seen as being in need of treatment or already is a patient in a therapeutic facility. These data suggest that the community may be less tolerant of Anger-Defiance in girls than in boys. An alternative hypothesis is that girls high on Anger-Defiance are actually more "sick" or deviant than boys, since so many fewer girls in the normative population have high scores, and therefore, a high Factor II score is legitimately considered a more serious sign of disturbance for a girl.

Most previous epidemiological studies have used a one-dimensional model of emotional disturbance. For example, both Srole *et al.* (1962) and Lurie (1970) used a one-dimensional rating of emotional impairment as their index of disturbance. In these studies the psychiatrist's rating of emotional impairment was taken at face validity; in the present study we have demonstrated that our measures of disturbance differentiate well functioning from poorly functioning subjects.

In the present study we have found a two-dimensional model to be highly efficient in selecting disturbed cases from a Day Care population and from reference groups with various levels of disturbance. The two-dimensional model not only selects high proportions of true positives, but at the same time retains the information provided by the factor scores with regard to type of disturbance.

Research carried out over recent years has begun to yield information about the correlates of the two factor dimensions. In one study (Kohn and Rosman, 1972a) we have shown that the factor dimensions are moderately stable over time; i.e. child who scores high on Factor I on one occasion is likely to score high on the same Factor one and two years later, and similarly for Factor II. Furthermore, we have shown (Kohn and Rosman, 1972b) that the children who score high on Factor I (Apathy-Withdrawal) show deficiencies in intellectual functioning in the preschool period and that high Factor I but not Factor II scores during the preschool period are predictive of underachievement in the early years of elementary school attendance.

A study on the early mother–child relationship (Kohn and Rosman, 1971) suggests that children high on Factor I have had a very different kind of maternal experience than children high on Factor II—the mothers of the former were primarily controlling and over-protective, while the mothers of the latter were rejecting and provided very discontinuous care.

In a program of therapeutic intervention (Kohn and Rosman, 1971) we found children high on Factor I to respond quite differently than children high on Factor II. The children high in Apathy-Withdrawal initially were unresponsive to or avoided the teacher, who served as the therapeutic agent. Only gradually, and over time, did they become more attached to her. As the Individualized Teaching progressed, these children found it increasingly difficult to separate from the teacher at the end of the hour of Individualized Teaching. On the other hand, the children high in Anger-Defiance responded with immediate interest and enthusiasm. As the Individualized Teaching progressed, however, their involvement with the teacher became increasingly negative. Their response to the teacher became less friendly, and they found it progressively easier to separate from her. Because the relationship had to be interrupted daily, at the end of each hour of Individualized Teaching, the apparent longing of these children for a consistent, lasting, and accepting relationship was disappointed and we assume that it was for this reason they became alienated from the teacher.

SUMMARY

The purpose of this study was to test the validity of a proposed two-factor model of emotional disturbance. Two teacher rating instruments, the Social Competence scale and the Problem Checklist, both of which measure two major, relatively orthogonal factor dimensions of social-emotional functioning—Factor I: Interest-Participation vs. Apathy-Withdrawal; Factor II: Cooperation-Compliance vs. Anger-Defiance—were applied to 1425 children, ages 3–7, in Day Care centers, day treatment facilities, and a mental hospital. The children were divided into groups varying in level of disturbance. Disturbed children scored significantly higher (disturbed) than healthy children on either Apathy-Withdrawal or Anger-Defiance or both. The factor dimensions were found efficient for the selection and identification of disturbed children from a normal population.

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APPENDIX A*

Factor I items (Apathy-Withdrawal)
Body appears stiff and rigid when standing, sitting, lying down or being held.
Has mournful, downcast expression, seems sad.
Seldom smiles.
Is listless or apathetic.

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* The initial description of the instruments contained here appeared in *Developmental Psychology* (Kohn and Rosman, 1972a).

Moves head or body in a very slow way.
Hardly speaks at all.
Speaks in a faint or weak voice (not due to known physical causes).
Is shy or bashful with most adults.
Acts overly fearful and cautious.
Acts extremely frightened to the point of screaming and crying. (Disregard where child screams or cries out of anger.)
Is self-conscious.
Is preoccupied and in a world of his own to the point of being unresponsive to things or to people.
Does not defend himself when others shove, hit, accuse or criticize him.
Stays close or clings to mother or adult.
Is shy or bashful with most children.
Behaves like a little adult, for instance: does not seem to have fun, acts in a restrained manner, etc.
Has an aloof and distant manner.
Is overly sensitive; feelings easily hurt.
Is very much a follower; does not initiate play with other children.
Occupies himself continuously with one type of activity and resists leaving it to do anything else.
Exhibits drowsiness throughout the day.
Requires urging to take part in activities.
Fails to play with most other children.
Stares blankly into space without appearing to be looking at or thinking about anything.
Appears bewildered or confused.

Factor II items (Anger-Defiance)
Eats, sucks or drinks inedible substances such as plaster, ink, sand, cloth, wood, toys, etc.
Is restless and unable to sit still.
Has temper tantrums (e.g. screaming, kicking, stomping, holding breath, etc.).
Screams or bangs objects, etc. when angry, irritated or frustrated.
Gets easily irritated or bothered by things or by people.
Is tense or jittery in everyday situations or activities.
Gets angry when interrupted at play by adult as part of normal routine (not punishment).
Appears jealous when teacher pays attention to other children.
Often starts fights with other children.
When working with materials becomes bothered or upset when he cannot make things "just right" or put them in perfect order.
Says he is going to kill himself.
Talks about death and killing.
Disobeys directions or instructions of adult.
Is unresponsive to friendly overtures by adults or children.
Seeks attention through rowdy or "show-off" behavior.
Bullies, hits or picks on other children.
Gives excuses for not following classroom procedures or rules of game.
Is extremely active: has to always be "on the go".
Hurts others, tells untruths, or destroys property without seeming to feel badly.
"Talks back" to adults in a defiant and fresh manner.
Swears or curses, using "Hell", "Damn" or other four-letter words.
Is destructive in regard to his own and/or other's property.
Deliberately maltreats other children.
Is easily aroused to anger.

Note: Each item is rated on a three point scale, as follows: Not at all typical (0), somewhat typical (+1), very typical (+2).

SOCIAL COMPETENCE SCALE (KSC)

Factor I items (Interest-Participation vs. Apathy-Withdrawal)
Child can communicate his emotional needs to the teacher (+).

Child needs adult aid for each step of activity (−).
Child is responsible in carrying out requests and directions (+).
Child adds freely (verbally or nonverbally) to teacher's suggestions (+).
Child shies away and withdraws when approached by other children (−).
Child can be independent of adult in having ideas about or planning activities (+).
Child can be independent of adult in overcoming difficulties with other children or activities (+).
Other children seem unwilling to play with this child (−).
Child feels comfortable enough with other children to be able to express his own desires or opinions (+).
Child is fearful in approaching other children (−).
Child gets willing cooperation from most other children (+).
Child is bossed and dominated by other children (−).
Child's ideas have impact on many children in the classroom (+).
Child easily gets attention of other children (+).
Child has difficulty defending his own rights with other children (−).
In play with other children, child can shift between leading and following, depending on the situation (+).
Child is unable to occupy himself without other children directing activities for him (−).
Child is willing to turn to other children for help and assistance (+).
Child can give ideas to other children as well as go along with their ideas (+).
Child appears at a loss in unstructured free play types of activities (−).
Child seems to enjoy both play with others and by himself (+).
Other children copy this child's ideas for play (+).
Child participates in a half-hearted way (−).
Child demonstrates little interest in things and activities (−).
Child is responsible in following through on routines, for example, getting dressed or undressed, washing hands, etc. (+).
Child seems eager to try new things (+).
Child spends time sitting around, looking around or wandering around aimlessly (−).
Child can remain alert and interested in any activity (+).
Child succeeds in getting others interested in what he is doing (+).
Child shows interest in only a few types of things (−).
Child responds well when the activity is planned or directed by the teacher (+).
Child easily loses interest and flits from one activity to another (−).
Child can participate actively in structured activities as well as free play type of activities (+).
Child easily gives up when confronted with a difficulty (−).
Child shows enthusiasm about work or play (+).
Child seems to be at a loss when first coming into the classroom (−).

Factor II items (Cooperation-Compliance vs. Anger-Defiance)
Child seeks adult attention by crying (−).
Child seeks physical contact with teacher (−).
Child expresses open defiance against authority. (−)
Child responds with *immediate* compliance to teacher's direction (+).
Child frowns, shrugs shoulders, pouts or stamps foot when suggestion is made by teacher (−).
Child needs excessive praise and encouragement from teacher in order to participate in activities (−).
Child is unwilling to carry out reasonable suggestions from teacher even when having difficulty (−).
Child hits teacher (−).
Child can accept teacher's ideas and suggestions for play or ways of playing (+).
Child needs teacher's attention at nap time. (−)
Child gives the appearance of complying with teachers' suggestions, but does not do suggested activity (−).
Child rebels physically, for example: has temper tantrums, hits, kicks, etc. (−).
Child needs special attention at lunch or snack time (−).
Child cooperates with rules and regulations (+).

Child dawdles when required to do something (−).
Child reacts negatively to teacher's ideas and suggestions for play activities (−).
Child actively defies teacher's rules and regulations (−).
When making a change from one activity to another, child resists entering the new activity (−).
Child easily makes the change from one activity to the next (+).
Child is hostile or aggressive with other children, for instance, pushes, taunts, bullies, etc. (−).
Child has to be a leader in order to participate in activities with other children (−).
Child is a picky eater (−).
Child takes possession of other children's equipment without their permission (−).
Child is open to the ideas and suggestions of other children (+).
Child is quarrelsome (−).
Child is dominating and bossy with other children (−).
Child prevents other children from carrying out routines (−).
Child has difficulty resting during naptime (−).
Child puts things away carefully (+).
Child is unwilling to play with other children except on his own terms (−).
Child disrupts activities of others (−).
Child has difficulty leaving school at end of day (−).
Child has difficulty falling asleep during naptime (−).
Child has trouble keeping to the rules of the game (−).
Child cries during naptime (−).
Child acts silly at lunch table, for example: giggles, throws food, shrieks, etc. (−).
Child resists going along with the ideas of other children (−).

Note. The value for some items is positive and for others, negative. This is due to the fact that both factors of the Social Competence Scale are bipolar (both interest *and* apathy, cooperation *and* defiance are detected). The appropriate sign for each item is indicated above in parentheses after each item.

Note also that each item is rated on a seven point scale as follows: Always = 1, Very Often = 2, Often = 3, Sometimes = 4, Seldom = 5, Hardly ever = 6 and Never = 7.

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SPECIAL EDUCATION FOR MALADJUSTED CHILDREN AND ADOLESCENTS IN NORWAY

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INTRODUCTION

THE SCANDINAVIAN countries are justifiably proud of their concern for human well-being, and since the 1930s they have instituted massive programmes to improve the general welfare, health and housing conditions of families with children (Nelson, 1953). The needs of handicapped children have not been neglected, and much has been done in Denmark, Sweden and Norway to encourage the satisfactory development of these children and to provide appropriate educational facilities for them. Norway, although poorer in national resources than either Denmark or Sweden, the achievements of which countries are better known outside Scandinavia than those of Norway, has for some time been actively developing provision for all types of handicap. Special schools for deaf, blind and subnormal children were established in Norway during the nineteenth century, an act of 1881 making education for children in these categories compulsory between the ages of 7–16 (Taylor and Taylor, 1960); and much progress has been made during the present century in providing various forms of special educational treatment for children with these and other handicaps. Although, following the Law on Protection for Children enacted in 1896, some residential provision in "Observation Schools" was made in Norway for pupils showing disorderly or criminal behaviour (Johansen, 1960), special educational provision for maladjusted children—children with behaviour problems or emotional disturbance—has (as in other countries) developed more slowly and at a relatively late stage as compared with provision for other groups of handicapped children.

This paper reviews current trends in the provision of special educational treatment for maladjusted children and adolescents in Norway, on the basis of visits to a variety of schools and classes specifically catering for the needs of emotionally disturbed pupils, and discussions with a number of people closely involved in this work. While the view presented will of necessity be a very limited and subjective one, it is to be hoped that, as very little has been written in English on this topic, the impressions recorded here will be of interest. Before the current provision for maladjusted pupils is discussed, the scene will be set with a brief reference to the main factors which affect the extent and nature of such provision in Norway, namely geographical considerations, the role of the State in educational developments, and attitudes towards the education and treatment of maladjusted children.

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Geographical considerations

Norway has a small and thinly scattered population. Although in area it is $1\frac{1}{2}$ times the size of Great Britain, its population is only about seven per cent that of Britain. Consequently, many children are educated in very small schools. It is not easy to make local provision for handicapped pupils in sparsely-populated rural areas, so that in the past there has been a dependence on residential schools catering for children from many parts of Norway, with the resultant removal of the child from his normal environment. It is not surprising that much more varied facilities for the maladjusted, including day schools and special classes, are to be found in Oslo and its neighbouring communities (where a high proportion of the population reside) than in the remoter areas of the country. Admittedly, as Johansen (1960) points out, problems of maladjustment tend not to be as great in small rural schools, where teaching can be individualized to a great extent, as in large urban schools; but there is currently a move towards the centralization of schools and towards creating much larger units. This is likely to accentuate problems of behaviour disturbance.

Role of the State

Although local authorities in Norway have been playing an increasingly important part in the development of the educational system in Norway, the State exercises more control over the schools than is the case, for example, in Britain. The Ministry of Church and Education lays down all school curricula, and must approve all text books used by teachers, checking them for both language and content. Individual teachers have little say in the choice of text books, which in the main are selected by the local authority. Special schools and classes tend to be given somewhat more freedom, but even here the principle of State approval obtains. In the past, much of the special school provision for maladjusted children has been established under the direct aegis of the State, which also lays down regulations concerning the proportion of time which local authorities should devote to special education in the ordinary school. State control over curricula and text books would hardly be welcomed by British teachers, but the power given to the State to initiate direct action in the provision of special educational treatment has meant that adequate provision of facilities is not left entirely to the mercy of local authorities, some of which may be disinclined to take vigorous action. Already in Norway about 9 per cent of the total teaching time in schools is devoted to special or remedial education (Ministry of Church & Education, 1971), nearly twice as much as in 1960 (Trygve Lie, 1960). As local authorities are reimbursed by the state for expenditure incurred by them on special education up to 10 per cent of their total educational budget, they are encouraged to devote this proportion of teaching time to special education.

Attitudes towards maladjusted children

Education in the ordinary schools of Norway tends to be formal and teacher-dominated rather than individualized and child-centred. Orderly behaviour is expected in the classroom, and the pupils, the majority of whom have parents with a strong interest in educational achievement, present few behaviour problems.

Nevertheless, in this rather rigid school climate, disruptive behaviour is not easily tolerated, and it is hardly surprising if a moralistic attitude towards such behaviour has tended to prevail in Norwegian schools. But, in spite of this, the teachers have a very humanitarian attitude towards their pupils. Punishment is rarely given and in fact corporal punishment in schools was abolished over a hundred years ago. Gradually the moralistic approach to the problems of maladjusted pupils—seen as "bad" rather than "emotionally disturbed"—has been replaced by a more positive, non-condemnatory approach (Nelson, 1953), although it is still the case that teachers of special classes in the ordinary school complain that their work is ill-understood by their colleagues.

The distinction often made in Britain between the juvenile delinquent and the maladjusted child or adolescent who has not committed an offence in the legal sense is somewhat blurred in Norway, where the minimum age of criminal responsibility is 14 years and where it is quite common for prosecution to be waived, or conditional sentences to be imposed, up to the ages of 18 or even beyond this (Christie, 1960; Central Bureau of Statistics of Norway, 1970: Criminal Statistics.). This means that a substantial proportion of those admitted to residential special schools for the maladjusted are likely to have a delinquent record.

It should also be mentioned that there is no tradition of boarding school education in Norway apart from that provided for handicapped pupils, so that some parents are likely to be resistant to the idea of their child being sent away from home.

TYPES OF PROVISION

Traditionally, the main burden of providing for the needs of maladjusted or delinquent children and young persons in Norway has fallen on religious, philanthropic or other voluntary organizations (Nelson, 1953), whose provision has been supplemented by the State. More recently, local authorities have begun to take a more active part in making facilities available for maladjusted pupils in their own community.

Under the Act of 1951, dealing with special schools, the State is required to provide such schools—primary, continuation, and vocational—for maladjusted children and young persons up to the age of 21. This is done through the Special Schools Division, one of the divisions of the Department for General Education. To the Special Schools Division is attached a Council for Special Education—an "Expert Advisory Council", appointed by the King as an autonomous advisory body (Dalin, 1969). The regulations of the Act were not intended to prevent the Ministry of Education from authorising a local authority or other body to establish and administer special schools, but the Ministry is required by law to approve the rules and regulations of all these schools. There are now 12 *State Special Schools* catering for about 230 maladjusted pupils,* under the Ministry of Church and Education; most of the pupils (of whom boys outnumber girls by two to one) are between 13 and 16 years of age, though they may enter between the ages of 9 and 18 and may stay until they are 21.

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* Owing to the rapidly changing scene, and the inevitable delays in the publication of official statistics, figures quoted in this paper should be regarded as only approximate.

A variety of *Residential Treatment Centres* or *Homes* are provided by voluntary bodies, in some cases in collaboration with the State or local authority, or by the hospital service. These are usually closely connected with psychiatric clinics for children and adolescents, and all have teachers (or a school) attached to them. Over 400 pupils are catered for in about thirty of these centres (Norwegian Association of Treatment Homes for Children & Adolescents, 1971).

Some local authorities provide day or residential special schools for maladjusted pupils, but in the main local efforts have concentrated on helping these pupils to remain in the ordinary school, either through special classes (termed "observation" classes) or by providing extra individual help; additionally, in the smaller communities in particular, some maladjusted pupils are placed in small classes ("hjelpeklasser") mainly catering for slow learners. Such provision testifies to the growing awareness of "the danger of isolation which is inherent in life in a boarding school and which may impede the future transfer to regular employment" (Nelson, 1953) and of the need to keep children in their own home environment whenever this is possible. Although Oslo has a number of special kindergartens for emotionally disturbed children and there is a growing number of observation classes for children up to 15, the majority of the special classes cater for older pupils, aged 15 and over.

Most of the residential schools and treatment centres are co-educational. They are not large institutions, catering for no more than 14–30 pupils. Special classes, too, are usually very small, maximally containing 8 pupils but normally consisting of only 3 or 4 pupils.

There are plans for the establishment, on a country-wide basis, of Special Education Centres, to be run by the county ("fylke") authorities. About 6 of these are now in operation. These Centres, staffed by psychologists, social workers and specialist teachers of handicapped pupils, in addition to providing the usual school psychological service, give advice and help to the ordinary schools of the area in connection with their handicapped pupils, provide a peripatetic teaching service, and are building up a material resource bank from which teaching aids for work with handicapped children are made available to the schools. Although still in an experimental stage, these Centres are proving successful and are providing a model to be followed elsewhere in Norway.

Psychotic children and adolescents are rarely accepted by special schools or treatment homes, and where residential treatment is necessary, they are usually admitted to hospital. In 1969 (Central Bureau of Statistics of Norway1971— Mental Hospitals) 222 patients (124 males; 98 females) under 20 were admitted to 21 mental hospitals, mainly for some form of psychosis. At the end of 1969, 155 young persons (79 males; 66 females)—representing approximately 0·05 per cent of the total age group—were categorized as "mentally diseased" and were receiving care or treatment, mainly in mental hospitals or nursing homes. However, in Asker (west of Oslo) there are two special treatment homes for psychotic children, each catering for 8 children.

DIAGNOSIS AND REFERRAL

The facilities available for the diagnosis of pupils referred as possibly maladjusted, and the procedures adopted for referring certain pupils for placement in special schools, vary from district to district and also according to the type of institution involved, whether under the control of the State, local authority or voluntary body. Though formal procedures involving the Ministry of Education are usually required, direct referral by parents and even the children themselves is encouraged by the establishments, and there has been a growing tendency for the Ministry of Education to allow local authorities to conduct their own affairs in relation to the schools and classes under their aegis.

Norway has no local authority child guidance team tradition along British lines, but the school psychological services (discussed in more detail later) have developed well in recent years, and it is these services, working in conjunction with the local authority inspector for special education, which have the main responsibility for referring children. The school psychological services are supplemented by outpatient child psychiatric clinics which in some cases work very closely with schools forming part of the same psychiatric hospital as provides the clinic.

Typically, where a child presents problems of maladjustment, the school staff try to solve the problem themselves. Many junior high schools (for pupils aged 13–16) have counsellors and "social teachers" on their staff to assist them in this task, and the social teacher may visit the home to involve the parents. If the school wishes for further help, the headteacher makes a formal application to the school inspector, who refers the case to the school psychologist's office. The school psychologist sends for the parents and makes a recommendation for treatment and/or special placement to the inspector. If the recommendation is to a State School, the inspector, through the Director of Education, makes an application for a vacancy to the Ministry of Education, which submits a case history to the headteacher of the special school. If, on the basis of the written report, the head is willing to accept the case, the child is placed on the waiting list for admission. The procedure may take as long as one or two months.

Where a child is excluded from school, where there is a difficult home problem, or where the parents are not willing to co-operate with the suggested placement, the case will be referred to the local authority's Child Welfare Committee, which, as a result of a series of Acts, has the main responsibility for the care and protection of children. The Child Welfare Committees are charged with ensuring adequate protection and care of various groups of children deprived of a normal home life, as well as having concern for promoting the welfare of all children and young persons within their area of jurisdiction. A Committee may, in the case of maladjusted or delinquent children and young persons, take action even against the will of the parents who, however, have the right of appeal. In such cases, the Committee is always presided over by a local judge, whereas in other matters it is a lay body appointed by the municipal council.

The schools and treatment centres themselves are anxious to take in only pupils who "want to come" and who have parents willing to co-operate with them: otherwise, it is felt that little benefit will be derived from placement. They tend to accept pupils of at least average intelligence, and, although few schools cater for severely-disturbed children, including aphasic, autistic and brain-damaged children, most are, as previously mentioned, reluctant to accept psychotic children. They also showed a reluctance, when asked what types of children they had in their establishment, to categorize their pupils in any clear-cut way. Mostly, the problems presented were nervousness, anxiety, aggressiveness, truancy or dislike of school (school phobia did not appear to be a common complaint in Norway), learning difficulties, and some form of delinquency. Some of the children came from materially deprived homes, but poverty was not felt to be the main problem in most cases—"children get money these days instead of love".

AMENITIES AND STAFFING

The outstanding features of the provision of special education for maladjusted pupils in Norway are, particularly from the point of view of a visitor from Britain, the excellent buildings and the extremely favourable staff–pupil ratio. Not all the buildings, of course, are new and purpose-built, but a number of the schools and treatment centres have been set up within the last 10 years and the newer purpose-built establishments succeed in being both attractive and homely. Where buildings are old, replacements are often being actively planned. In a number of the institutions, the pupils have individual rooms. There seems to be no shortage of educational equipment.

As already mentioned, schools and classes are kept small, and it has become the custom to allow 1 teacher (sometimes with an assistant) for a group of no more than 3 pupils. In the State special schools, there is approximately 1 teacher for every 2 pupils. According to official figures (Central Bureau of Statistics of Norway 1970—Primary and Continuation Schools) there were, in October 1969, 101 full-time teachers (71 male, 30 female) and 15 part-time teachers (12 male, 3 female) for the 222 pupils in these schools. The schools attached to the residential treatment centres are also well-staffed. Further, the teaching staff, particularly in the treatment centres, are well-supported by a generous staffing of personnel able to devote themselves entirely to therapeutic aims.

To illustrate, Bjerketun Treatment Home (whose school is the responsibility of the Baerum local authority, the Home being the responsibility of the Ministry of Social Welfare) caters for about 16–20 adolescents, referred from the whole of Norway. The staff consists of a principal (over the whole institution), a head-teacher and five teachers, an occupational therapist, a full-time psychologist, a social worker and ten housestaff (usually referred to as "milieu therapists"). Varna State Special School for Maladjusted Boys, which has extensive grounds including a farm, has a maximum intake of 27 pupils. The staff totals 27, 6 of whom are teachers; there is a part-time psychologist. Fjellbrott Residential Treatment Centre for Maladjusted Adolescents, providing for 14–16 pupils, has a staff of 27, including 6 teachers, 1 full-time psychologist and 10 milieu therapists. Wøyen Day School (under the Baerum local authority), with an intake of 18–24 pupils, has an establishment of 6 teachers, but when visited by the writer had two vacant teaching posts owing to the shortage of applicants. The school attached to the National Residential Psychiatric Centre for Children and Young People in Oslo (the school is the responsibility of the Ministry of Education, the hospital being under the control of the Ministry of Social Welfare) has, for 60 pupils in residence, 16 teachers, supported by 6 occupational therapists providing a link between the school and the wards.

A high proportion of the staff of the institutions visited had only recently been appointed to their posts and many had not had formal training as teachers of maladjusted pupils, although training for work with handicapped pupils is required by law (Act of June 16, 1961). Some of them, not surprisingly, felt somewhat insecure and were anxious for support from more experienced colleagues; the psychologists in particular considered it one of their functions to provide this support. Obviously, there was little danger, where such generous staffing was provided, of feelings of isolation on the part of the adults in the institutions, and there appeared to be a well-defined staff structure, so that the role and status of each member of staff was reasonably clear. In some cases, there was valuable liaison between teachers and other professional workers who joined forces, for example, within the classroom, so that the class became more than a narrow teaching unit. However, one could not help feeling that the dangers existed, when there were so many adults in a small institution, of the institution becoming adult rather than child-centred, of members of staff getting in each other's way, and of an undue amount of time being spent on liaison between adults, necessary as this obviously is. In such circumstances, too, it is perhaps difficult to provide a home-like atmosphere, and problems arising in the course of daily routines may easily be exaggerated. Nevertheless, the great advantages to be derived from a favourable staff–pupil ratio must not be underestimated, and in the case of special classes it makes good sense to give a teacher, who receives little on-the-spot support from others, the maximum opportunity of giving her pupils individual attention.

METHODS OF APPROACH

It is very difficult to generalize, in the case of special schools and classes for maladjusted pupils, about methods of treatment: much depends on the individual personalities and attitudes of the staff involved. In the schools and classes visited, a wide range of approaches was discernible, from an emphasis on moral education, obedience to rules and the value of a structured routine to a considerable amount of permissiveness. However, perhaps because there is a very limited choice in full-time courses of training for teachers of maladjusted pupils, certain common features were apparent. No clear-cut theoretical approach seems to guide work in the institutions, though it is influenced by many theorists. As one psychologist stated, he had no definite theoretical frame of reference, but was much influenced by the work of Freud, Erikson, Piaget, and Rogers. Rather there is an emphasis on building self-confidence through success in school work and on treatment within the classroom context, as well as on the therapeutic benefit to be derived from stable routines of normal daily life. Importance is attached to frequent meetings of pupils and/or staff, and to dealing with crises as they arise rather than on regular psychotherapy. In some cases, short-term treatment over a period of months is aimed at; mostly, the stay at a special school is about two to three years or even longer.

Success in school work

The schools and classes try to function along as normal lines as possible, with the usual range of school subjects being taught, though obviously concessions have to be made in the light of the pupils' emotional difficulties. The small numbers in the teaching groups help to make teaching varied and individually-based, to encourage a positive teacher–pupil relationship, and thereby to maximize the therapeutic effect of classroom life. As might be expected, therapy as opposed to teaching receives more emphasis in the residential treatment centres than in the special schools and classes, but nowhere is the formal education of the pupils neglected. The location of most of the schools and centres makes open-air projects both practicable and enjoyable, and the staff take advantage of opportunities to organize group outings in the mountains and forests. At Varna State School, the boys derive much pleasure from building and using their own huts in the grounds of the school. At the Fjellbrott Centre, at the time of visiting, two members of staff had taken one of the adolescent pupils, who had not been responding well to treatment within the institution, on an excursion into the country, to last several days.

Crisis intervention

Except in the hospital-based centres, there is little individual psychotherapy in the usual clinical sense. Even most of the psychologists in the institutions prefer to involve themselves in the total life of the establishment, including work with groups of children and their families, rather than spend time on individual therapy as such. The dominant aim of the institutions is to make the routines of daily living as normal and therapeutic as possible, and problems which arise in the course of the day serve as starting points for discussions with individuals or groups. The crisis intervention model of Fritz Redl seems to be an influential one in this connection (Redl, 1959).

Group meetings

The value of regular group meetings was frequently commented on by the staff of schools and centres. Fjellbrott Centre, for example, holds meetings of all the pupils twice daily, and also regular meetings to consider inter-staff relationships and to encourage sensitivity training. At these meetings, problems and matters of any kind can be brought up by any member of the community and are freely discussed. Such meetings are often supplemented by smaller group discussions and case conferences.

Mixing with the outside community

The schools and centres are anxious "not to be institutions" in the formal sense of the word. The children are encouraged to go out as much as possible, for example to dance-school or ski-school or to local youth clubs. One residential centre for girls has a discothèque to which boy-friends are invited: the staff hold regular formal meetings with the girls' boy-friends, who have to attend if they wish to be allowed to visit the girls in the institution.

Work with parents

Although contact with parents is not easy to maintain in the case of schools admitting children from a wide area, the importance of work with parents is generally recognized. Parents are welcomed at the schools and centres, and meetings with parents are frequently organized. At Fjellbrott, the crisis intervention approach is extended to the families of the children: on one occasion, two members of staff stayed with a family in crisis for several hours each day for a period.

THE PREPARATION OF TEACHERS

Specialized training for teachers of handicapped children is given mainly at the Statens Spesiallaererskole—The Norwegian National Graduate College of Special Education (under the Ministry of Education)—at Hosle, near Oslo, which is now just over ten years old. Entry qualification is a Teachers' Certificate gained at one of the State training colleges, either after a 2-year course, for students holding the Matriculation certificate of the Gymnasium (usually taken at about 19) or a 4-year course, based on an entry examination for applicants aged 17+ held by the State Council for Teachers' Training (it should be noted that 3-year courses are already replacing the 2-year courses in some colleges, and that 3 years' training is likely to be the minimum in the future (Dixon, 1965)). Qualified preschool or kindergarten teachers are also admitted, and some students come from a university study of education or psychology. The course at the Statens Spesiallaererskole lasts two years, Part I (1 year) being a common course for prospective teachers of a variety of handicapped children and Part II (a further year) allowing specialization in one of five areas—auditory defects, visual defects, speech handicaps, subnormality or maladjustment. Part I can be taken externally, and many part-time courses are provided throughout Norway to enable students to take the examination qualifying them for posts as remedial teachers of reading or to proceed to Part II, which can be taken only at Statens Spesiallaererskole.

Part I at this College aims to give a broad introduction to special education, and requires attendance (this is really compulsory) for about 450 periods of theory (a period is 45-min) as well as 120 periods of practical work, in classes for slow learners and remedial reading centres, in addition to a variety of visits (Prospectus 1971–72). The syllabus includes developmental, educational and social psychology; personality and adjustment; psychiatry and neurology; retardation and subnormality; the psychology of reading; methods of dealing with difficulties in reading and mathematics; handicaps in children; assessment and observation of children; organization and administration; and dealing with emotional and social problems of children in the school situation. Students are involved in lectures and seminars to the extent of 18–20 hours per week. During the current session (1971–72), 140 students are pursuing the Part I course.

The Part II option in the education of maladjusted children and adolescents is currently being taken by 25 students, being prepared for specialist educational tasks in educational, medical and social institutions for the emotionally disturbed. This involves up to 450 periods of theory (some in common with other courses) and about 300 periods of practical work in special schools, classes and clinics (2 or 3 days a week). The course requires the study of diagnosis and therapy; the psychology of groups; the theories of Piaget; personality theory; sociology; educational approaches to maladjusted children; observation in the classroom; assessment; psychiatric treatment; environmental therapy; and juvenile delinquency. The main emphasis is placed on diagnostic and didactic aspects. Students are required to have a detailed knowledge of specified books. The current list includes a number of American works, for example those by Redl, Ginott, White (*The Abnormal Personality*), Rogers and Hewett (*The Emotionally Disturbed Child in the Classroom*). An eclectic approach is adopted to the problems of treating maladjusted children: the students are introduced to a wide range of current theories and practices, from which they will ultimately select an approach—or an amalgam of approaches—which they find appropriate. At the end of the course, the students have to sit lengthy examination papers.

Qualified teachers, preschool teachers and kindergarten teachers can also be trained for work with emotionally handicapped children at the Nic Waal Institute (a child and adolescent out-patient unit and the main Norwegian training centre in dynamic child psychiatry and psychotherapy), which offers a programme lasting two to three years.

PSYCHOLOGICAL SERVICES

The effective diagnosis, education and treatment of maladjusted pupils depends not only on the quality of the special schools and classes available but also on adequate support from the psychological and social services. As shown above, many of the schools and centres had generous psychological help, some of them having a full-time psychologist on the staff. Additionally, although the psychological approach characteristic of much American work with families and children, does not have a long history in Scandinavia (Nelson, 1953) and the first school psychological service was not established until just after World War II (Vormeland, 1960), there has been a rapid growth recently of both school and clinical psychological services, providing advice and varied forms of treatment for maladjusted children and adults. In spite of the lengthy training required of a school or clinical psychologist (6 or 7 years at university, usually followed by in-service training under supervision) there is a plentiful supply of psychologists, more than trebling between 1958 and 1968 (Ministry of Church & Education, 1971). Oslo, for example, has 17 school psychologists for a school population of about 57,000, and a service based on nearby Ski has 3 school psychologists for 8,800 children in three rural municipalities. Baerum, a local authority not far from Oslo, has 4 school psychologists for 12,000 pupils, in addition to school counsellors in each junior high school. The Ministry of Education's aim is to have 1 school psychologist for approximately 3,000 pupils, and in a number of areas this excellent ratio (by British standards) has already been achieved.

To illustrate the functions of the school psychological service, that at Ski established 10 years ago, in addition to group testing, dealt individually with 431 children and adolescents (268 boys; 163 girls; comprising 5·5 per cent of the school population) during the year 1969–70. This number included 177 pre-school children (below the age of 7), who were given school readiness tests to see whether they were mature enough to start school somewhat earlier than usual. Most of the others were between the ages of 7 and 16. The main reasons for referral were learning difficulties (122 pupils); nervousness (34); behaviour problems (36); truancy and school phobia (18); speech problems (19); and difficulties in concentration (15).

Action and recommendations for dealing with these problems included transfer to a special class for retarded children (29); extra teaching in an ordinary class (33); individual teaching along specified lines (52); advice to school (87); advice to parents (102); advice to pupils (24); support contact with pupil (16); support contact with the home (15); special school for retarded (17), auditory defects (2), speech defects (2) and maladjusted (8); speech therapy (17); treatment centre (2); foster or children's home (4); psychiatric out-patient clinic (16); psychiatric in-patient clinic (4); social measures to help adjustment of whole family (12); advice to families over a long period (28). These figures, quoted from the report of the school psychological service for 1969–70, show that a variety of educational and treatment facilities were available to the service, and that there was an emphasis on modifying the school or home environment of the child rather than on individual therapy of any kind. The psychologists made frequent visits to the schools, and organized courses in group dynamics for the teachers in the area.

The direct services of a psychiatrist are not readily available to the school psychologists. The child guidance team model, including medical personnel, is seen rather in the Mental Health service. In the rural district of Lørenskog, near Oslo, the county has a Child Psychiatric Unit, attached to the hospital. This unit has a staff which includes four psychiatrists, four psychologists, four social workers and four consultant teachers. These teachers have, in fact, a non-teaching role, assisting rather in diagnosis and specializing in giving advice to teachers in ordinary schools. The Østbytunet Residential Treatment Centre for Neurotic and Near-Psychotic Children and the Bråten Residential Treatment Centre for Neurotic and Near-Psychotic Adolescents are parts of this unit, and each of these centres has a school, with its own head and teachers.

EVALUATION

It is evident that a great deal of progress has been made in Norway, particularly during the 1960s, in providing specialized facilities for the education and treatment of maladjusted children and adolescents in Norway. Because of the recency of the establishment of many of the Homes and special schools and classes, it is difficult to make an overall assessment of their efficacy. The impression was certainly given of vigorous and devoted work in this field, and of a realistic, knowledgeable and sympathetic approach, free of undue sentimentality. There was no evidence of a parsimonious attitude to spending money on special education, and those working with maladjusted children enjoy very good material conditions. However, there was no complacency among them, and inspectors, headteachers and teachers made no attempt to present the situation in an over-favourable light. They were, in fact, very free with realistic comments about gaps and inadequacies in the system.

These comments included reference to the long waiting lists for admittance to special schools, the shortage of trained teachers especially in country districts, the lack of follow-up facilities for school leavers, the lack of evidence based on research on what were the real needs of maladjusted pupils in Norway, and the unsympathetic and uninformed attitude of many of the ordinary schools as well as of the public in general. One teacher specializing in work with severely disturbed children and currently experimenting with educating them in a special class within an ordinary school, spoke of the negative response she had met, in the past, from many of her colleagues in ordinary schools. A headteacher of a small school for disturbed children which formed a physical part of a large ordinary school also mentioned the hostility of the teachers in the ordinary school to her maladjusted pupils, who were "blamed for everything" which occurred in the building. Another headteacher felt that maladjusted children were often wrongly placed in classes for slow learners. In spite of the generous teacher–pupil ratio, it was generally considered that maladjustment was the most neglected of the handicaps. One inspector felt that not enough was being done with young children, and that most of the work was with the older adolescents, when it was rather late to hope for success.

Although, as mentioned above, the school psychological services visited by the writer considered direct contact with schools to be an essential part of their work, the comment was frequently made that the schools were in general not satisfied with the help they received; "they have to wait too long a time before they get an answer, and then they do not really get an answer". Reasons suggested for this state of affairs (which, of course, may not obtain everywhere) included the inadequate training of school psychologists, and a lack of school-based experience and work: "school psychologists are well-trained in psychology, but are very insecure about their job".

It might be hoped that the school psychological service would be helping to bring about a more informal and child-centred approach in the school system, but at present there is little evidence of this. In the words of Dalin (1969):

"*There exists, in Norway, a relatively well developed school psychological service. In some ways this works as a feedback mechanism within the school system. The problems which school psychologists work with are, indirectly, of importance for the development of the school. However, there is no clear mechanism for channelling the experiences of the school psychologist to an organization that can change the existing conditions.*" (p. 38)

However valid all the above criticisms may or may not be, the sophistication of the services—social, psychological and educational—for maladjusted pupils in Norway was most impressive to a visitor, and there is no doubt that the progress made during recent years will be continued in the future. As Dalin (1969) observes, the education of handicapped children is a central consideration in Norway at the present time, and is likely to remain so in the next few years.

SUMMARY

This paper reviews current trends in the provision of special educational treatment for maladjusted children and adolescents in Norway. Types of provision, methods of diagnosis and referral, the amenities and staffing of the schools and classes, and the main methods of approach are discussed. An outline is also given of the specialized training of teachers of maladjusted pupils and of the functions of the school psychological services in Norway. Although many of the special schools, Treatment Homes and classes have not been established long enough for an evaluation of their work to be made, substantial progress has clearly been recorded in recent years.

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Special Schools, Treatment Centres and Special Classes visited. Haug School, Baerum (day school for mentally and neurologically handicapped children); Asengata School, Oslo (day school for maladjusted children); Woyen School, Baerum (day school for maladjusted boys); Bjerketun Treatment Home, Baerum (residential school for maladjusted adolescents); Fjellbrott Residential Treatment Centre for Maladjusted Adolescents, near Drammen; Varna State Special School for Maladjusted Boys, near Moss; Larkollen Home for Maladjusted Adolescent Girls, near Moss; Hammer School (special class for maladjusted children), Lorenskog, near Oslo; Ostbytunet Residential Treatment Centre for Neurotic and Near-Psychotic Children, Lorenskog, near Oslo; National Residential Psychiatric Centre for Children and Young People, Oslo; Majorstua School, Oslo (special division for very disturbed children and adolescents).

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SURROGATE REHABILITATION OF MONKEYS REARED IN TOTAL SOCIAL ISOLATION

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It has long been known that total social isolation of macaque subjects for the first 6 months of life or more results in profound and persistent behavioral abnormality (Harlow and Harlow, 1962; Mason and Sponholz, 1963; Rowland, 1964; Harlow *et al.*, 1965; Sackett, 1968a). Upon emergence from isolation these monkeys exhibit excessive social fear and avoidance of contact by other monkeys. Their subsequent social repertoires are characterized by severe deficits in play, aggressive, sexual, and maternal activities. In addition, isolate-reared subjects exhibit self-directed disturbance activity, including self-clasping, rocking, and stereotypy, phenomena rarely observed in well-socialized monkeys. These behavioral anomalies have proven to be exceedingly resistant to reversal. Few investigators have reported measurable success in rehabilitation of isolate-reared monkeys, although many have tried (Mitchell *et al.*, 1965; Mitchell and Clark, 1968; Sackett, 1968b; Pratt, 1969).

A recurrent difficulty encountered by those who have employed normal stimulus animals as socializing agents for isolate subjects has involved the behaviors shown by the stimulus animals toward the isolates. Specifically, these behaviors have been characterized by frequent and persistent aggression for subjects whose major social deficits include excessive social fear and avoidance of social contact (Rowland, 1964). Under these circumstances it is not surprising that the isolates have continued to exhibit disturbance activity.

Extensive study of normal social maturation of rhesus monkeys has indicated that contact acceptability is basic to the development of appropriate social behavior (Harlow and Harlow, 1968). Indeed, "contact comfort" has been demonstrated to be a primary motivating factor among rhesus infants (Harlow, 1958). During normal development the infant not only receives contact comfort from its mother but also develops a sense of basic security and trust and uses its mother as both a tactical and psychological base when venturing into novel environments (Harlow and Harlow, 1965).

Monkeys reared in total social isolation never experience maternal security, and when they emerge from isolation such security is not provided by aggressive peers. Nor is it likely that an adult female would provide a 6-month isolate with contact acceptability, since monkey mothers actively reject their own infants well before they reach 6 months of age (Harlow *et al.*, 1963).

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However, it has been demonstrated that inanimate, cloth-covered surrogate mothers can provide infants with both contact acceptability and basic security (Harlow and Zimmermann, 1959). Given these capabilities and the fact that, unlike peers and monkey mothers, inanimate surrogates possess neither aggressive nor rejecting responses, it was postulated that exposure to inanimate surrogates might allow isolate-reared subjects to develop contact acceptability and promote social recovery. The following therapy procedure was thus initiated for a group of isolates.

METHOD

Subjects

The subjects were 4 rhesus monkeys (*Macaca mulatta*), 2 males born within a week of each other, and 2 females also born within a week of each other but 6 months earlier than the males. All subjects had been separated from their mothers at birth and reared for the first 10 days of life in the laboratory nursery, according to the procedure described by Blomquist and Harlow (1961). Each subject was then placed in an isolation chamber, fully described by Rowland (1964), where it remained for the duration of its first 6 months of life, unable to see or contact any social agent.

Procedure

At 6 months of age each monkey subject was removed from its isolation chamber and placed in a bare ¾-in. wire mesh cage 2·5 × 2 × 2·5 ft in size, where it could see and hear but not touch other monkeys. Following 2 weeks of such housing, a heated, simplified surrogate (Harlow and Suomi, 1970) was placed in the isolate's cage. After 2 weeks of housing with surrogates, like-sexed pairs of subjects were placed, with their surrogates, in a 6 × 3 × 4 ft group-living cage. Subject pairs and surrogates remained in the group cage for 8 weeks.

Data collection

Each subject was observed for two 5-min periods daily, beginning on the day of emergence from isolation and continuing for a total of 12 weeks. During each observation period, subject behaviors falling into each of 14 behavioral categories were scored for presence or absence during each of the 20 15-sec intervals which comprised the 5-min session. A description of behaviors encompassed by each category is given in Table 1.

Three experienced testers, each of whom had previously been trained to a rigorous laboratory reliability criterion, recorded the subjects' behaviors. Each tester scored approximately one-third of the observation sessions. All testing was completed between the hours of 8.30 A.M. and 4.30 P.M. daily. Order of testing among subjects was randomly determined.

Data analysis

Inspection of the data indicated that behaviors encompassed by five categories were infrequently exhibited by the subjects, and hence scores from these categories were not subjected to statistical analysis. For each of the remaining categories—self-clasp, rock, stereotypy, self-mouth, locomotion, environmental exploration, surrogate contact, partner contact, and social play—scores of individual subjects were summed over 6 2-week time blocks: the 2 weeks of individual housing following removal from isolation, the 2 weeks of individual housing with a surrogate, and each of the 4 2-week blocks which comprised the 8-week period that pairs of subjects lived together with surrogates in the group cage. Each sum was then divided by the number of observation sessions included in the time block, yielding a mean representing the average number of 15-sec intervals per 5-min session during which behaviors encompassed by the category were observed. The means were then subjected to a two-way repeated measures analysis of variance, with sex of subject (or subject pair) as the independent variable and time block as the repeated measure. A Duncan New Multiple Range Test (Duncan, 1955) was subsequently performed on the means from those categories whose analysis had yielded either a significant time block effect or a significant interaction.

TABLE 1. DESCRIPTION OF BEHAVIORAL CATEGORIES EMPLOYED

Self-groom.	Discrete, self-directed picking and/or spreading of the fur
Self-mouth.	Oral contact, exclusive of biting, with any part of own body
Self-bite.	Specific, vigorous, self-directed bite
Self-clasp.	Clasping of any part of own body with hands and/or feet
Huddle.	Self-enclosed, fetal-like position incorporating any or all patterns of self-clasp, self-embrace, or lowered head
Rock.	Repetitive, nonlocomotive forward and backward movement
Stereotypic movement.	Identical body movements maintained in a rhythmic and repetitive fashion for at least three cycles
Vocalization.	Any sound emitted by subject
Locomotion.	Ambulation of one or more full steps
Environmental exploration.	Tactual and/or oral manipulation by subject of inanimate objects, e.g., towel, toy, cage, lock
Surrogate contact.	Tactual, oral, or body contact with inanimate surrogate
Partner contact.	Tactual and/or oral contact with another subject exclusive of ventral cling, aggression, or play
Play.	Any socially directed play activity, including rough-and-tumble, approach-withdraw, and noncontact play
Aggression.	Vigorous and/or prolonged biting, hair-pulling, and clasping of another subject, accompanied by one or more of threat, barking, pilo-erection, or strutting

RESULTS

The results of the present experiment indicated that isolate-reared monkeys exposed to surrogates, then housed in pairs with surrogates, exhibited significant recovery of basic social and nonsocial behavior patterns and significant declines in self-directed disturbance activities. However, the subjects failed to develop sophisticated, age-appropriate patterns of social behavior, and in this respect recovery from isolation-induced deficits was not complete. The results are summarized in Fig. 1–3.

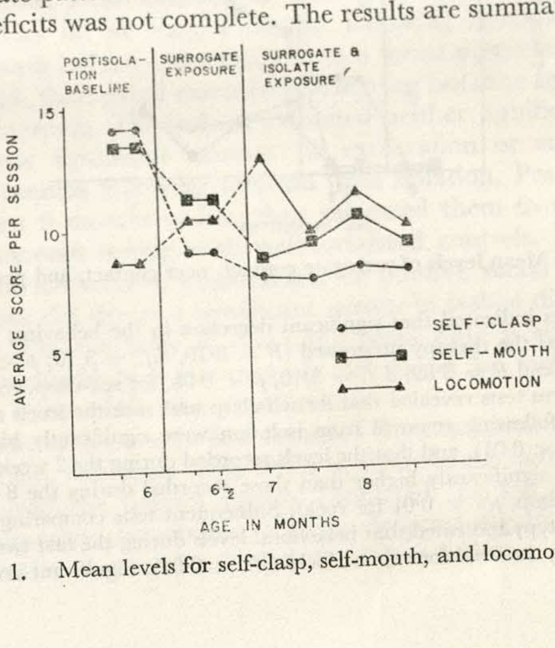

FIG. 1. Mean levels for self-clasp, self-mouth, and locomotion.

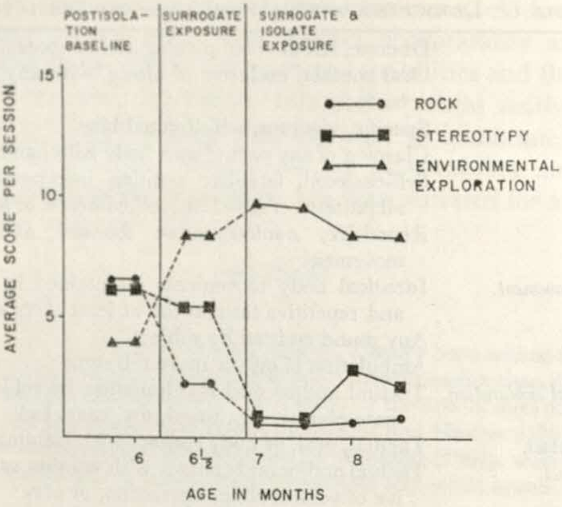

FIG. 2. Mean levels of rock, stereotypy, and environmental exploration.

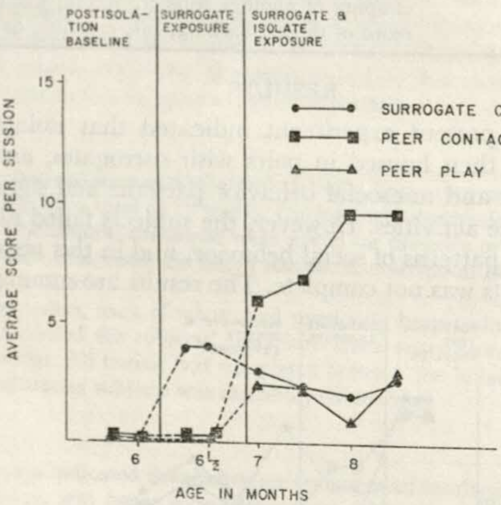

FIG. 3. Mean levels of surrogate contact, peer contact, and peer play.

The data analyses indicated that significant decreases in the behaviors of self-clasp, rock, and stereotypy occurred as the therapy progressed ($F = 8{\cdot}19$, $d.f. = 5/10$; $p < 0{\cdot}005$; $F = 6{\cdot}73$, $d.f. = 5/10$, $p < 0{\cdot}005$; and $F = 3{\cdot}89$, $d.f. = 5/10$, $p < 0{\cdot}05$, for self-clasp, rock, and stereotypy, respectively). Subsequent tests revealed that for self-clasp and rock the levels recorded in the 2-week period immediately following removal from isolation were significantly higher than during any other time block (p's $< 0{\cdot}01$), and that the levels recorded during the 2 weeks of individual housing with surrogates were significantly higher than those recorded during the 8 weeks of pair housing (p's $< 0{\cdot}05$ for self-clasp, p's $< 0{\cdot}01$ for rock). Subsequent tests comparing time block means for the category of stereotypy indicated that behavioral levels during the first two time blocks exceeded those recorded during the final four time blocks (p's $< 0{\cdot}01$). Significant sex differences were also detected by the self-clasp ($F = 84{\cdot}77$, $d.f. = 1/2$, $p < 0{\cdot}025$) and self-mouth ($F = 18{\cdot}73$, $d.f. = 1/2$, $p < 0{\cdot}05$) analyses, with males exhibiting higher levels of both behaviors.

Correspondingly, the levels of locomotive and exploratory behaviors increased as the therapy progressed. Analysis of variance of both sets of scores yielded significant time block effects ($F = 3{\cdot}57$, $d.f. = 5/10$, $p < 0{\cdot}05$; $F = 4{\cdot}38$, $d.f. = 5/10$, $p < 0{\cdot}05$ for locomotion and environmental exploration, respectively), with subsequent tests indicating significant improvement over presurrogate levels in all other time blocks for both categories (p's $< 0{\cdot}01$).

The most informative results were yielded by analysis of the social categories of surrogate contact, partner contact, and play. Significant time block effects were detected for all categories ($F = 3{\cdot}78$, $d.f. = 5/10$, $p < 0{\cdot}05$; $F = 8{\cdot}01$, $d.f. = 5/10$, $p < 0{\cdot}025$; and $F = 5{\cdot}14$, $d.f. = 5/10$, $p < 0{\cdot}05$ for surrogate contact, partner contact, and play, respectively). However, the pattern of change over time differed among the three measures. Surrogate contact dropped when isolate pairs were permitted interaction (p's $< 0{\cdot}01$), while partner contact showed a progressive increase during the interaction period (first 4 weeks of partner interaction < last 4 weeks, p's $< 0{\cdot}01$). Play behavior between isolate pairs was exhibited at relatively low levels and failed to show a systematic increase throughout the therapy period.

Thus, the analyses indicated that the subjects exhibited marked improvement during the therapy period in terms of increases in locomotive, exploratory, and contact-oriented social responses and decreases in disturbance activity. Attainment of age-normative levels of play activity, however, was not achieved by the subjects in this study.

DISCUSSION

The results of this experiment indicated that limited reversals of deficits produced by 6 months of isolation rearing from birth could be obtained in monkey subjects via exposure to surrogates and fellow isolates. Use of a control group would have greatly enhanced the design of the study, but it can be argued that appropriate control data exist from a number of previous researches. For example, Rowland (1964) subjected his 6-month isolates to a battery of postisolation tests, including home cage and social playroom observations, social dominance tests with control subjects, and numerous learning tests. These subjects exhibited no significant increases in exploration, social contact, or social play and no significant decreases in disturbance activity for at least 4 months following removal from isolation. Clark's (1968) 6-month isolates were adapted to a social playroom three times per week during isolation, then tested extensively following isolation in both their home cages and in the playroom. The isolates exhibited neither significant drops in disturbance activity nor significant increases in exploration or any positive social activity for over 6 months following removal from isolation. Pratt (1967) isolated monkeys for the first 9 months of life, then subjected them to several months of home-cage and playroom testing with well-socialized controls. He found no significant increases in locomotive, exploratory, or positive social behaviors over 3 months of testing but did detect a significant *increase* in isolate disturbance activity during this period. On the basis of these and other data it seems unlikely that significant recovery would be spontaneously developed by monkeys following 6 months of isolation initiated shortly after birth.

When the present subjects were first removed from isolation they, like monkeys so reared before them, exhibited high levels of disturbance activity. When surrogates were introduced the isolates readily contacted the soft, warm, inanimate bodies, and consequently disturbance activity dropped significantly while locomotion and exploration increased substantially. When isolate pairs were permitted social interaction, social contact continued to rise but was increasingly directed toward other isolates rather than to the surrogates. The observed increase in social contact suggests that the isolates had developed contact acceptability.

What the isolates failed to develop in this study were sophisticated social responses. This is best evidenced by the finding that play behavior did not increase systematically throughout the therapy period. Play is a precursor of more mature social responses among normal monkeys, and the relative absence of play among the present subjects provided an accurate premonitor of their subsequent activity. Following the formal observation of the male isolates, the subjects were housed as a group of four for a period of 8 months. No appreciable behavioral improvements over those recorded during the formal experiment were disclosed. Rather, the subjects continued to exhibit infantile social behaviors and sporadic disturbance activity. Clearly, complete recovery was not achieved by the present therapeutic procedure.

The reason the isolates failed to develop adequate play behavior may well lie in the fact that these subjects were never exposed to play interactions other than the infantile efforts of their equally damaged partners. Such stimulation was certainly not provided by the surrogates. A cloth mother may have the power to supply contact comfort and security, but it makes a dull playmate. Development of contact acceptability is probably crucial for social recovery of isolation-induced deficits, but it is clear that contact acceptability alone is not sufficient for complete recovery. Most likely a necessary addition to the therapeutic procedure is stimulation by an active, reciprocating social agent, a task better suited for animate age-mates than for inanimate surrogates.

SUMMARY

Four rhesus monkeys were reared in total social isolation for the first 6 months of life, then exposed to surrogates and subsequently housed in pairs. The isolates exhibited significant decreases in abnormal behavior patterns and developed crude patterns of social interaction throughout this period, but failed to develop sophisticated social behaviors such as play. The rehabilitative capabilities and limitations of surrogates for isolate-reared subjects are delineated and discussed.

Acknowledgements—This research was supported by USPHS grants No. MH-11894 and RR-00167 from the National Institutes of Health to the University of Wisconsin Primate Laboratory and Regional Primate Research Center, respectively. The author expresses his gratitude to Mrs. Roberta Sprengel and Mr. William Gunderson for their assistance in collecting the data.

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J. Child Psychol. Psychiat., Vol. 14, 1973, pp. 79 to 80. Pergamon Press. Printed in Great Britain.

BOOK REVIEWS

Experimental Child Psychology. H. W. Reese and L. P. Lipsett. Academic Press, New York, 1972, pp. xiv + 782. £6.30.

This, as it's editors note in their Preface, "is the first book devoted specifically to experimental child psychology". A further distinctive and welcome feature is that, instead of soliciting a collection of papers and then taking the credit for installing them between hard covers, they have functioned as editors should: the contributions of eighteen authors have been edited, rearranged, and integrated into a coherent volume. Despite this procedure, individual differences have not been completely submerged, occasionally to the detriment, but more often to the advantage, of the work as a whole. Collating and actively editing separate contributions has its advantages, including more detailed coverage of a greater expanse of topics. But it also has its limitations. The most important of these is that once solicited, a chapter cannot be rejected as inadequate without risk of serious affront to the author. Nor can it be grossly amended without the same risk applying. Fortunately, few of the contributions to this volume reflect the disadvantages.

What is experimental child psychology? While it is not considered worthwhile to distinguish between "child psychology" and "child development", experimental child psychology can be characterized "in such a way that is meaningfully distinct from other branches of developmental psychology". The characteristics of this approach to the study of child behaviour and development include a preference for "the study of basic processes", basic rather than applied research, and the use of experimental methods. These characteristics are presented as *preferences* in work style, rather than as the necessary and absolute features. The first chapter is devoted in part to clarifying and developing these views, and in part, to presenting the methods used in child psychology. As if to assert its identity as a distinctive being, the final section of this chapter presents a set of ethical standards for child psychologists. It might also have been predicted that the theme "experimental child psychology is a science" would not be far from the surface of the first chapter. This prediction is not negated, thus endowing the field with respectability from the moment of conception.

The next nine chapters are devoted to what can be called "classical topics": sensory processes, conditioning, verbal learning and memory, transfer, set, attention and motivation. All these chapters, in addition to providing up-to-date reviews of the subject matter, are constructively critical and emphasize methodological aspects of the studies. Finally, they provide explicit directions for future research. For anyone wanting a fairly sophisticated introduction to these topics the early chapters will prove invaluable.

The next four chapters, dealing with perceptual, emotional, language and cognitive development, are perhaps the most varied in the collection. The chapter on language acquisition is outstanding. It manages to be informative and balanced in it's presentation of complex and controversial material, and is, at the same time, comprehensive. In marked contrast, the chapter on emotional development provides only a cursory overview of the topic. For example, just over one page is devoted to "attachment behaviour" and only one study is considered in this context. The chapter on cognitive development is devoted to Piaget, whose work, of course, can never be adequately considered in one chapter. Nevertheless, there is a useful attempt at evaluating Piaget's work. Perception, like Piaget, requires more than one chapter if coverage is to be fully satisfactory. However, the systematic and critical way in which aspects of perception are dealt with here will serve as a useful model for examining those topics not covered by this chapter.

Intelligence has two chapters devoted to it: the first is unbalanced and possibly unnecessary whereas the second is comprehensive if somewhat biased. In discussing statistical theories of intelligence, thirteen lines are allowed to Spearman, twice as much to Thurstone, and four times as much to Guilford. Quite what determined such unequal weights is unknown. Burt and Vernon are not mentioned, nor are Cattell's concepts and theory of Fluid and Crystallized intelligence given any space.

In view of the recent controversies on the question of genetics and I.Q. it is perhaps not surprising that this topic is essentially avoided. This, it seems to me, is because there has been no attempt to regard "genetics and I.Q." and "race and I.Q." as separable issues. Such avoidance does not then lend credence to the later assertions: "Social reform is one area of human endeavour. The accumulation of a body of scientific information is another. . . . Nothing is gained, however, by failing to make a clear distinction between the roles of social reformer and scientific investigator." (p. 555).

The remaining three chapters cover socialization, biogenetic factors in development and behaviour modification. The first is primarily an idiosyncratic conceptual analysis and the chapter which deviates most from the preferential characteristics of experimental child psychology; the second covers undergraduate physiological psychology and "brain damage", subjects which one would not usually associate with the chapter heading they had been given; and the third, the only major concession to applied child psychology, provides a basic introduction to behaviour modification.

Given it's size and scope, the imperfections in this volume are few and some of these are not substantial. If used in conjunction with the series "Advances in Child Development and Behavior", edited by Reese, Lipsett and their colleagues, it will provide an excellent baseline text.

Michael Berger

The Humanisation Processes: A Social, Behavioral Analysis of Children's Problems.

Robert L. Hamblin, David Buckholdt, Daniel Ferritor, Martin Kozloff and Lois Blackwell. Wiley–Interscience, New York, 1971, pp. xxi + 305. No price stated.

The book describes a series of experimental studies of behaviour modification techniques with children in the home, the school and in the clinic. Four separate groups of children are involved: a normal preschool group; a black, "disadvantaged" group; a hyper-aggressive group, and an autistic group.

Substantial evidence is presented to show how a structuring of the exchange between teacher or parent and child can quite strikingly affect a wide range of behaviors' from the ability of 35-month-old children to read to the development of functional speech in autistic children. Carefully planned, individually designed training programmes are combined with material rewards, both immediate and delayed, immediate feedback and social approval, together with "Time out" procedures or withholding rewards for deviant behaviours.

The experiments involve many well-designed control situations which demonstrate the value of material reinforcers, either immediate or in "back-up" form, over social reinforcement alone, the relationship of the strength of reinforcers to changes in behaviour, (the so-called "acceleration–deceleration" principle), the need for contingent rather than non-contingent rewards, and the "intensification by reversals effect". This latter phenomenon, whilst a common finding in many behaviour modification experiments, is here used rather ingeniously as a treatment technique in its own right. The authors also show how the treatment procedures may be implemented not only by trained teachers or the children's parents but by other people involved with the child, including his peers.

Treatment programmes are adequately described and data are, on the whole, well presented, both in tabloid and graphical form. The only major exception to this is in the final sections of the chapter on the "Remediation" of autism, where, although the programmes designed for modifying social, play and group language behaviours are briefly outlined, reports on the effectiveness of such programmes are cursory.

Despite the generally clear presentation of experimental designs and treatment effects, however, the theoretical aspects of the book are far less impressive. The imposingly titled "Structure Exchange Theory" is little more than a re-vamping, often in rather abstruse terms, of Skinnerian theory; definitions of reinforcers—"positive . . . if they induce a pleasant feeling state . . . negative if they induce an aversive or painful feeling state", are questionable, and there would seem to be no justification (there is certainly no evidence reported) for attributing the failure of few children to respond to treatment to the use of punishment by teachers or parents. In addition to this, the authors also seem to ascribe to the fallacious argument that since certain deviant behaviours may be *modified* by deliberately altering reinforcement contingencies, "children behave badly primarily because they are inadvertently acculturated to behave badly".

As an introduction to the theory relating to behaviour modification techniques, the value of the book is doubtful. Those already involved in such work with children, however, should find, if they are not deterred from reading the book by its rather pretentious title, that the authors have some sound practical advice to offer regarding treatment procedures and the measurement of the effectiveness of these procedures.

Patricia Howlin

A two factor model of emotional
disturbance in the young child:
validity and screening efficiency.

hn, Martin and Rosman, Bernice L. (1973) A two-factor model of emotional
turbance in the young child: validity and screening efficiency. *J. Child Psychol.*
chiat. **14,** 31–56.

mmary—The purpose of this study was to test the validity of a proposed two-factor
del of emotional disturbance. Two teacher rating instruments, the Social Competence
ale and the Problem Checklist, both of which measure two major, relatively ortho-
nal factor dimensions of social-emotional functioning—Factor I: Interest-Participation
Apathy-Withdrawl; Factor II: Cooperation Compliance vs. Anger-Definance—were
plied to 1425 children, ages 3–7, in Day Care centers, day treatment facilities, and
mental hospital. The children were divided into groups varying in level of disturbance.
sturbed children scored significantly higher (disturbed) than healthy children on
her Apathy-Withdrawal or Anger-Defiance or both. The factor dimensions were
und efficient for the selection and identification of disturbed children from a normal
pulation.

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special education, Norway

hazan, Maurice (1973) Special education for maladjusted children and adolescents
Norway. *J. Child Psychol. Psychiat.* **14,** 57–69.

ummary—This paper reviews current trends in the provision of special educational
eatment for maladjusted children and adolescents in Norway. Types of provision,
ethods of diagnosis and referral, the amenities and staffing of the schools and classes,
d the main methods of approach are discussed. An outline is also given of the specia-
zed training of teachers of maladjusted pupils and of the functions of the school psycho-
gical services in Norway. Although many of the special schools, Treatment Homes
d classes have not been established long enough for an evaluation of their work to
e made, substantial progress has clearly been recorded in recent years.

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parent–child
interaction, methodology

Lytton, Hugh (1973) Three approaches to the study of parent–child interactio
ethological, interview and experimental. *J. Child Psychol. Psychiat.* **14,** 1–17.

Summary—The problems of naturalistic observation, interview-ratings and expe
ments are reviewed as they presented themselves in an investigation of the emergen
of social characteristics in 2-year-old boys. The methods adopted for obtaining a b
havior record in the home are described in detail. Reliability figures are reported a
the difficulties of achieving reliability in such data are compared with the relative e
of achieving good reliability in experimental settings. The important question, it
concluded however, is which method provides theoretically more meaningful results.

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sex differences, new-born,
oral behaviour

Korner, Anneliese (1973) Sex differences in newborns with special reference to
ferences in the organization of oral behavior. *J. Child Psychol. Psychiat.* **14,** 19–29.

Summary—While there is cumulative evidence in the literature that males and fem
are treated differently from the start, a review of the sex differences found am
neonates clearly points to innate sex differences as well. The newborn female tentativ
emerges as more receptive to certain stimuli, particularly of the oral and cutaneous ty
At the same time, she is no way less active or expressive, as no significant differen
have been found in activity level or crying. There is suggestive evidence that the m
newborn is endowed with greater muscular strength. Since the literature on adult
differences suggests persistence, either in direct or derivative form of the sex differen
found in newborns, an explanation of these differences on maturational ground
not the most cogent. More plausibly, the hormones responsible for sexual differentiat
in utero may account for the sex differences at birth through sensitization of the organis

surrogate rehabilitation,
monkeys

ll, S. J. (1973) Surrogate rehabilitation of monkeys reared in total social isolation.
ild Psychol. Psychiat., **14,** 71–77.

mary—Four rhesus monkeys were reared in total social isolation for the first
nths of life, then exposed to surrogates and subsequently housed in pairs. The
es exhibited significant decreases in abnormal behavior patterns and developed
patterns of social interaction throughout this period, but failed to develop sophisti-
social behaviors such as play. The rehabilitative capabilities and limitations of
gates for isolate-reared subjects are delineated and discussed.

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J. Child Psychol. Psychiat., Vol. 14, 1973, pp. 81 to 95. Pergamon Press. Printed in Great Britain.

THE EFFECTS OF MATERNAL EMPLOYMENT ON CHILDREN*

BARBARA WALLSTON†

University of Wisconsin

THIS REVIEW will attempt to integrate research dealing with one specific aspect of maternal employment—its effects on the children. As in many areas of child development research, there are important methodological problems involved, and some consideration of these issues seems necessary to provide a framework within which to analyze the relevant literature.

First, it is important to clearly define the criteria for sampling working mothers. Attention must be paid to how long the mother has worked, what hours she works, whether or not she works at home and whether the family is intact or broken. By the same token, the employment history of the non-working mothers must be considered, rather than simply defining this group as a residual category of women not working when the data is collected.

Siegel and Haas (1963) also point out that because many studies are "problem family" oriented, research workers often begin with distinct biases. "*While some studies have proceeded to damn the working mother, others are examples of special pleading in the attempt to 'exonerate' her*" (p. 516).

Control groups are also a problem in this research. With any control group of non-working mothers, an important self-selection factor operates which may result in many unintended control–experimental group differences.

Studies often fail to control for variables known to be related to working such as family size, socio-economic status (SES), educational level, residence, age of offspring, and ethnic background. Undoubtedly, there are more endogenous variables relating to self-selection, such as achievement-orientation, ambition, and sex-role ideology, which are even less likely to be controlled (Siegel and Haas, 1963). Moreover, matching samples on such variables is not the sole answer to the self-selection problem. The likelihood is that results would be eliminated using such a procedure since results in opposite directions for different SES, for example, would cancel each other out. What is necessary is studies which deal with these factors as interacting independent variables.

In addition, studies often rely to a large extent on self-report data. Siegel and Haas (1963) suggest that these methods are vulnerable to subjects' defensiveness, and results may be highly inaccurate.

Finally, the choice as well as the measurement of the dependent variables is a significant problem. Sussman (1961) suggested as important: the socialization and

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* In their review article on working mothers, Siegel and Haas (1963) provide an excellent discussion of the methodological problems. This article is used as a basis for the following discussion.

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personality development of children, role structure and family relationships, and how social systems related to the family change functions when the mother is employed.

Within these broad categories of dependent variables, all of which have been utilized to some extent, there are nearly as many different operational definitions as there are studies in this area. This adds to the generality of results when they are consistent, but inconsistencies are quite difficult to interpret. Any attempt to compare and generalize across studies must take into account the great variety of operational definitions of the independent and dependent variables.

In an extensive review of this area by Stolz (1960), it was concluded that, "*One can say almost anything one desires about children of employed mothers and support the statement by some research study*" (p. 772). With a few exceptions, studies covered by Stolz will not be further detailed here; instead the more recent research in this area will be emphasized.

PRESCHOOL CHILDREN

Maternal deprivation framework. Much of the research on maternal employment began within the framework of the "maternal deprivation" literature. Yarrow (1964) in his review of this area, noted the difference between maternal separation and maternal deprivation, and pointed out that, "*maternal employment is considered in the context of separation because the fact of the mother's working has sometimes been equated with deprivation of maternal care*" (p. 116). Rossi (1965) noted the unwarranted extrapolation of the serious negative effects of prolonged parental separation to the conclusion that any separation of the mother and child is harmful. She cited a 1963 article by Spock which advised that, "*wanting more than motherhood is not natural but a reflection of her individual emotional disturbance*" (p. 107). Mead (1954) has condemned the over-emphasis on the importance of the tie between the child and its biological mother, and the unfounded insistence that any separation is damaging. "*On the contrary, cross-cultural studies suggest that adjustment is most facilitated if the child is cared for by many warm, friendly people*" (p. 477). Moreover, Yudkin and Holme (1963) pointed out that Bowlby, whose work on maternal deprivation is often extrapolated to the working mother's situation, actually distinguished between these. He cited evidence of a normal developmental quotient (D.Q.) for children in the second, third, and fourth years of life cared for at day nurseries, while a comparable sample of institutionalized children was below the average D.Q.

Thus, it is clear that the maternal deprivation literature is not the proper source for conclusions regarding the effects of maternal employment on young children. However, very few studies of young children published since Stolz's review were located.

Studies of young children. Moore (1969) compared children who had been cared for by a mother substitute for at least one year before the age of five to children who had been exclusively with their mothers, and followed them up until age eleven. Boys in the mother substitute group became more fearless and aggressive, while those in the latter group were more sensitive, fastidious and conforming according to mothers' reports and ratings in test situations. The results for the girls were similar but not as clearcut. Moore carefully noted that these findings represent "*contrasting trends of personality development rather than degrees of disturbance*" (p. 244). He cited an earlier phase of the same study reported by Yudkin and Holme which found that children with unstable care arrangements tended to exhibit difficult behavior indicating insecurity. However, he noted that the families who made shifting arrangements for substitute care were quite unstable and many stresses were evident, so conclusions as to causation cannot be drawn. Children with stable substitute care from 3 or 4 onwards, "*tended to become rather more self-assertive than those who had stayed with their mothers, but the differences were not marked*" (Moore, 1969, p. 244), and generally no harmful relationships were evident.

Nye *et al.* (1963) interviewed working and non-working mothers with children 3–5-year-old and the mother substitutes used by the working mothers. The group of working mothers and non-working mothers were similar with respect to age, education and husband's occupation. Measures of anti-social behavior, withdrawing tendencies and anxiety were derived from the structured interviews. Where both the mother and the mother substitutes were interviewed the correlations between their reports on these measures were only 0·55, 0·33, and 0·46, respectively. However, these different reports by mothers and mother substitutes could merely suggest that either children behave differently or are perceived differently by different adults. No significant differences on these measures were found between children of working and non-working mothers.

Burchinal (1963) using questionnaires, measured a variety of personality variables of seventh and eleventh grade children.

Since 92 per cent of his correlations, calculated within grade and sex, between five indices of maternal employment and the personality variables were not significant, concluded:

"*It would appear that maternal employment during the specified periods of the children's lives has no apparent relationship with the selected characteristics of the children. Notably, this conclusion holds for the relationship between maternal employment during the first three, second three and first six years of the children's lives and dependent variables measured during the early and late adolescent periods of the children's lives*" (p. 118).

Correlations with length of maternal employment are likely to include a number of zero values which could account for the low correlations. The correlations that did reach significance were quite consistent in showing daughters of working mothers to be more prone to neurotic and psychosomatic complaints. There was no clear pattern for the boys.

Yudkin and Holme (1963), in their review of early literature on employed mothers of young children, concluded that there was no evidence of long-term effects, with the qualification that few studies included children under two years of age.

Skard (1965) more recently reviewed work on maternal separation. She concluded that separation prior to six months of age is rarely harmful, as long as proper care and stimulation is provided. She hypothesized, on the basis of theories of attachment and fear of strangers, that between 6 months and 3 years, some continuity of care is necessary to develop emotional attachments and to provide a predictable environment. However, she presented no direct research evidence and recognized the problem in applying these hypotheses to the study of maternal employment. She suggested that the nature of substitute caretaking is of primary importance to this question, and concluded:

"*Looking at the different age groups of children, it may be said that for the babies, it is good to have mother with them. But it is still more important that she return daily and regularly at specific times. For some children, it seems to be better if their mothers have always been employed, since the actual transition from having a domestic mother is the most difficult for them*" (p. 342).

Recent studies of day care centers suggest that a mother's working need not be detrimental but can actually be beneficial to a child's development. At Syracuse University, for example (Caldwell and Richmond, 1968; Caldwell and Smith, 1970), a comparison of lower and middle class children between 6 months and 4 years found that those attending a day care center designed to provide an enriching environment showed gains in developmental quotient while a non-intervention control group tested regularly showed a decline. Ratings of adjustment made by a psychiatrist who did not know when children had entered the program showed no differences in adjustment between those entering before or after the age of three (Caldwell and Smith, 1970). In addition, at 30 months of age, no differences in child–mother or mother–child attachment patterns were detected in interviews with the mothers or observations of mother–child interactions between children attending the center and the non-intervention control group (Caldwell *et al.*, 1970). The positive findings, thus far obtained, lend support to the notion that with adequate substitute care, a mother's working need not be detrimental, and can in fact, be beneficial to the child's development in terms of the positive D.Q. gains shown here. In conclusion, there is almost no direct evidence regarding the positive or negative effects of maternal employment on young children.

Kibbutz reared children. A number of investigators have generalized from studies of children reared in Israeli kibbutzim to possible effects of maternal employment. However, it is important to remember that in Kibbutz society, all children have working mothers and thus, any effects which might be found in other societies due to the fact that the child of a working mother is "different" would not be evident.

Although kibbutzim differ greatly, a general pattern of child care can be described. Children from their birth live in children's homes rather than with their parents. However, the mother participates a great deal in early infant care. She does not work for the first six weeks and then gradually increases to full time work at about nine months. She nurses the baby and provides many other caretaking functions during this time, with the metapelet (nurse/house-mother) providing only supplementary care which gradually increases with the baby's age. After the first year when the infant moves to a toddler house with the same 4–6 infant peers, a new metapelet provides all caretaking and training functions, while the parents visit daily with the children for play and entertainment. Later several toddler's houses are combined to form a children's house (at age 4 or 7) and a teacher is introduced (Irvine, 1966).

In-depth studies of kibbutz children have not generally shown deleterious effects of this childcare arrangement, although the literature does include some controversy. Rabin (1965), using as data primarily projective measures of kibbutz children and controls at different age levels, concluded kibbutz multiple mothering, "*has* *no long-range deleterious effects upon personality development and character structure*" (p. 210). However, he found kibbutz infants to have lower D.Q.s which he attributed to being placed in the group situation before the infants were able to handle it. Spiro (1965) did not find any intellectual deficit, but on the basis of clinical impressions, characterized children as insecure, markedly withdrawn, hostile and high in need for approval. Bettelheim (1969) noted the general success in raising kibbutz children, although he found a leveling effect of education, with achievement attenuated at the lower and upper ends of the distribution. Rabin (1969) criticized Bettelheim's conclusions on leveling, noting that the effects were probably not statistically significant. The major difference between Rabin's and Bettelheim's discussions is in the choice of a control group. Rabin's criticism was based on the non-rural group as a relevant control, while Bettelheim suggested the urban high level students as the proper comparison. Rabkin and Rabkin (1969) studied the kibbutznik and showed him to be healthy, intelligent, generous, and shy, but warm. They noted, "*he shows no sign of the emotional disturbance we would expect from a violation of our ideal mother–child relationship*" (p. 46).

Using a larger, more representative sample than Rabin's (1965), Kohen-Raz (1968) drew contrary conclusions. He compared Israeli infants from 1–27 months, reared in kibbutzim, institutions, and private middle-class homes (most parents had college degrees), using assessment on the Bayley Mental and Motor tests. He found that until 6 months, kibbutz infants were superior to private home infants and thereafter there were no significant differences between these groups.

Shapira and Madsen (1969) compared cooperative and competitive behavior of 6–10-year-olds raised in a kibbutz to an upper-middle class city sample attending day camp. Playing a game under cooperative reward conditions, both groups were able to cooperate adaptively, but under competitive reward, the urban children competed in a non-adaptive manner, and received significantly less reward than the kibbutz children who cooperated and each received greater rewards. When the game was changed so that competition was adaptive, kibbutz children were, to a marginally significant degree, less competitive. The authors noted that competition between groups, rather than within the group, seemed to characterize the kibbutzniks' responses.

Based on concrete detailed observations of 24-week-old boys, Gewirtz (1969) described similarities and differences between children from single and multiple-child nuclear town families, kibbutzim and residential institutions. In general, kibbutz children were quite similar to those from multiple-child families and different from institutionalized infants. This again illustrates the inappropriateness of generalizing from institutionalized infants to children of working mothers.

Child care in the USSR. Children in the USSR frequently have working mothers, but no research was located regarding the results of their childcare arrangements. Mace (1961) briefly described the nurseries attached to places of employment at which Soviet women leave their children. As in the kibbutz, time is provided for nursing, and approximately 4 months maternity leave, with pay, is provided. He noted that:

> "*Western observers have been critical of this separation of mother and young child, which runs counter to some of our cherished doctrines. However, it is hard to substantiate this criticism.*

It would appear, from the high degree of emotional security that is readily observed among Soviet children, as a whole, that the maternal substitutes provided are adequate, and the early training effective" (p. 332).

Mace, however, equally failed to substantiate his conclusions.

Preschool literature summary. There seems to be no direct evidence of harmful effects of maternal employment on young children. What is crucial is the availability of proper substitute care. This is not readily available to many and serves as a major reason for mothers' not working in both England (Gavron, 1966) and the United States (Brooks, 1964). Mothers with very young children were least satisfied with child care arrangements and responded most positively to the question of possible use of a day care center (Ruderman, 1968).

SCHOOL AGE CHILDREN (PRE-ADOLESCENTS)

Children's characteristics. Direct studies are available on school age children, to a greater extent than for infants. In a study of 6- to 11-year-olds, Nolan (1963) found no significant differences in academic achievement and peer acceptance, both rated by teachers, between children with either employed or homemaker mothers.

Using observers unaware of mothers' work status to rate kindergarten children from intact families, Siegel *et al.* (1963) found no significant differences in dependent and independent behaviors between children of working and non-working mothers. The samples were matched for sex, age, SES, number of siblings and birth order. Working mothers had been employed for at least the last six months and non-working mothers had never worked. The authors did note, however, on eight of the ten behaviors, the differences were in the opposite direction for males and females. Had an analysis of variance testing this interaction been performed rather than 20 independent *t*-tests, it is possible that more significant results might have been found.

Mother–child relationship. Nye (1963b) used a questionnaire to study maternal adjustment to children. Mothers of first and tenth graders were tested and employed mothers showed slightly better adjustment to children. Although the respondents were unaware that the study related to maternal employment, this study is subject to the previously mentioned problem of defensive self-report.

Powell (1961, 1963) sent questionnaires to white, urban, middle-class mothers with nursery, kindergarten, second, sixth, ninth, or tenth grade children. Employment was defined as working at least 16 hours a week (which confounds part-time and fulltime work). No differences were obtained between employed and unemployed mothers on attitude towards child rearing, measured by a portion of Wiley's Child Guidance Scale.

Further distinctions among children of working mothers. Several studies used the more sophisticated techniques suggested in the introduction, in that the independent variable was further subdivided. Woods (1968) administered a series of psychological tests to fifth grade children, who reported that their mothers were employed. The sample was largely lower class blacks. When the sample was divided into those reporting supervision (i.e. some sort of substitute care) and those without supervision, girls without supervision showed impoverished cognitive and personal development; they also perceived their mothers as less controlling and intrusive.

Woods also noted that, "*in lower class American Negro families, maternal absence due to full-time employment was positively related to the social and intellectual development of their 10-year-old children*" (p. 4110-A). However, in this brief description, it was unclear whether this statement referred only to the supervised group, and if not, to whom full-time employed mothers were compared. Moreover, other differences between mothers who would leave children with or without supervision, might have been influential in mediating the poorer condition of unsupervised children. No indication as to whether these children came from intact families was made, and this is probably a relevant variable.

Spargo (1968) gave questionnaires to mothers utilizing Wisconsin day care centers, whose youngest child was between 1- and 9-years-old. Mothers were divided into those with less and more personal reasons for working (i.e. financial versus personal satisfaction); the latter showed more guilt and more negative attitudes on the questionnaire assessing attitude toward the effects of maternal employment. Spargo also found a significant relationship between satisfaction with day care and positive attitudes on the scale.

Hoffman (1963), using white intact families with children in the third to six grades, interviewed mothers, got teachers' ratings, a sociometric scale, and a questionnaire completed by the children. Working and non-working mothers were matched on father's occupation, sex of child, and birth order, and working mothers were classified as liking or disliking work.

"*The overall pattern of findings suggests that the working mother who likes working is relatively high on positive affect toward the child, uses mild discipline, and tends to avoid inconveniencing the child with household tasks; the child is relatively nonassertive and ineffective. The working mother who dislikes working, on the other hand, seems less involved with the child altogether and obtains the child's help with tasks; the child is assertive and hostile*" (p. 102).

Hoffman also concluded that both groups of working mother children showed lower intellectual performance than the children of non-working mothers.

Further differentiating groups, Yarrow (1961); Yarrow *et al.* (1962), divided working and non-working mothers into those who were satisfied and those who were dissatisfied. Data on child rearing was obtained from mothers' reports in this sample of white intact families, matched for number, age and sex of children, mother's age and education, and to some degree on SES. Although employment *per se* was almost unrelated to childrearing patterns and to the summary measure of adequacy of mothering (child rearing principles, limits for the child, sensitivity to the child's needs, warmth and emotional satisfaction in the mother–child relationship, etc.), the further breakdown according to satisfaction showed the dissatisfied non-working mothers to have the least adequate mothering and confidence in child rearing. There were few differences between satisfied and dissatisfied working mothers, but satisfied working mothers showed slightly less adequate mothering than satisfied non-working mothers. Regrouping by motives of family versus self-fulfillment in working mothers and love versus duty in non-working mothers provided similar results. It is unclear from the write-up how much overlap there was between the satisfaction and motive categorizations.

School-age literature summary. In general, the literature on the school age child has avoided many of the pitfalls discussed in the introduction. However, the Siegel *et al.* (1963) and Woods (1968) studies indicate the potential importance of differential sex effects, and although the other studies controlled for sex, data were not analyzed separately within sex, so effects might have been masked. Also, the problem of how long the mother has worked and the type of substitute care provided has been ignored (except for the somewhat "crude" division into supervised and unsupervised children by Woods (1968)). Given these restrictions, it seems that the differences obtained between children divided on the global variable working and non-working mothers are not consistent. However, there seems to be a consistent difference depending on role satisfaction, with satisfied mothers, working or non-working, producing different and generally better effects than dissatisfied mothers. Further work using better dependent measures and designed to investigate how these effects are mediated is necessary.

ADOLESCENTS

Adolescents have received more attention than other age groups, possibly because of the ease of getting a sample to complete a questionnaire (the most frequently used technique).

Achievement. The results of studies of differential achievement for adolescents of working and non-working mothers are inconsistent. No differences on achievement or intelligence scores of secondary school students were found by George and Thomas (1967) in India or by Armstrong (1966) who studied Iowa high school students. Nye (1963a) similarly found no difference in high school students' grade point averages (GPAs); nor did Nelson in ninth graders' school achievement. However, Nolan (1963) found higher achievement among children of employed mothers, using teacher's ratings as a criterion. The latter study differs from the others in the more subjective criterion and in its use of a homogeneous lower class rural sample (the other samples were more heterogeneous). The latter is probably the more important difference, since Roy (1963) found that in his rural high school sample, children of employed mothers had higher academic performance, while in the urban sample, the reverse was true.

Banducci (1967) divided his sample on sex and SES (fathers who were laborers, skilled workers, and professionals). He found only three significant differences: for "skilled worker" boys, the GPA was higher with working than with non-working mothers; for "professional" boys the reverse was true; for "laborer" boys, those with working mothers had higher scores on the Iowa Tests of Educational Development; there were no differences for girls. Farley (1968) also found that college males whose mothers had worked when they were younger had higher GPAs than those who had had housewife mothers, while there was no difference in GPA for females. Again it is apparent that by not blocking on relevant variables, SES and sex in this case, differences in achievement in these studies may have been obscured.

A further question to ask is why are the consistent differences there? Does working *per se* cause differential achievement or are there other characteristics of mothers who work, which differ according to social class, and underlie the relationship with achievement that is found?

Frankel (1964) compared high and low achieving high school males matched on

IQ in an attempt to answer this question. He found that more low than high achievers' mothers were employed, but that working and non-working mothers did not differ in SES. Among mothers who were employed, high achievers' mothers more often held professional positions, while low achievers' mothers held non-professional jobs. The working mothers of high achievers had more education than the non-working mothers in this group as well as the mothers of low achievers. Frankel suggested studying personality characteristics of the mothers to further illuminate the question. Based on his experience as a guidance counselor, he suggested that working mothers of low achievers "*seemed to reject their role as homemaker and in general were dissatisfied with their position in the family*" (p. 780). This group may be similar to the dissatisfied working mothers studied by Hoffman (1963). Frankel concluded that, "*there is no evidence that maternal employment* per se *contributes either positively or negatively to the academic achievement of these boys*" (p. 780). Further work is needed to determine the variables which mediate the relationship between maternal employment and academic achievement.

Child-rearing. Studies relating to differential child-rearing are relevant to this question. Peterson (1961) divided his sample of teenage girls on SES. He used both an objective index and mothers' self-ratings to form three groups: middle class on both indices, lower class on both, and cross-class. He found that lower class girls rated their mothers as showing less interest and control over them than middle class mothers irrespective of employment status. When mothers were further divided into those employed more or less than 35 per cent of their daughters' lives, the mothers in the middle class sample who were employed more showed significantly less interest and control. Middle and lower class mothers who indicated satisfaction with their work also were perceived as less controlling and less interested. Peterson further divided his sample into those from intact or broken homes. Employed mothers in broken families were perceived as exercising less control.

Whether these are the relevant variables for study is unclear but in any case this study is important in that differences were found to depend on SES, broken or intact family, and length of time spent working. As previously noted, many studies which do not block on such variables are probably obscuring results. Powell (1961, 1963), who did not block on SES (although the population seems to be upper-middle class) found no difference in child-rearing attitudes between working and non-working mothers of adolescents. Armstrong (1966), who also did not block on SES for this part of his study, found that working mothers were more permissive with their children. In addition, children of working mothers expressed more closeness to their parents than children of non-working mothers. In other analyses Armstrong did break his sample into blue-collar and white-collar families, although he did not report comparisons between working and non-working mothers within these groups. He concluded, "*family status is more closely related to child performance and attitudes than the simple factor of whether or not the mother works full time outside the home*" (p. 3126-A).

Personality adjustment. The most often assessed area in adolescents is the personality adjustment, and as mentioned before, the variety of measures here makes comparison difficult.

Using the number of problems checked by high school girls as an index of their adjustment, Whitmarsh (1965) found that daughters of employed mothers were better adjusted; when the sample was further divided according to SES, the finding was especially strong for middle class daughters, but held in the lower class as well. George and Thomas (1967) however, in the study previously cited, found no adjustment differences using a series of standard adjustment inventories. Their sample was from India and they failed to block on sex, so differences between these two studies may be reconcilable. Moreover, Whitmarsh (1965) may have had a biased sample, since only girls taking home economics were included. Using an adjustment inventory, Nelson (1968), in the study previously cited, found ninth grade boys whose mothers worked full time better adjusted than those whose mothers worked part time or not at all. For girls the pattern was less consistent, but the girls with non-working mothers tended to be better adjusted than those whose mothers worked part or full time. Thus, Whitmarsh's finding was not supported, and in fact the reverse was found. Different adjustment measures may account for this discrepancy.

Using delinquency as the dependent variable, Nye (1963b) found there were small significant differences showing higher delinquency among children with employed mothers as compared with children of unemployed mothers matched on SES, sex, residence, and family size. Nye, however, used the children's questionnaire responses to measure delinquency and concluded, "*The evidence appears to show that if Bossard's concept of the neglected, maladjusted child of the employed mother has any validity, the effects involved are small. School performance, psychosomatic symptoms, and affectional relationship to the mother appear unrelated to employment status of the mother. A small association appears to be present between employment status and delinquent behavior*" (p. 140). Roy (1963), also using a checklist of delinquent behaviors, showed no significant difference on this measure between sons or daughters in the rural or urban sample of employed and non-employed mothers. However, when boys and girls in the rural sample were combined, the rural children of employed mothers showed significantly less delinquency than the rural sample with non-employed mothers.

Douvan (1963) interviewed male and female adolescents from intact families to assess differences between those whose mothers worked part-time (p.t.), full-time (f.t.) or not at all (n.w.), in the working and middle class. She suggested a motivational pattern characterizing p.t. work which is based on choice and in which the mother maintains responsibility towards the family. Derived from this is a high degree of participation in leisure activities with the adolescents and a resultant energy, autonomy and responsibility in the girls, who identify with and model after their active, autonomous mothers. In the middle class, Douvan suggested that f.t. work is similarly motivated and a similar pattern exists, while f.t. lower class working mothers are motivated economically and are similar to the guilt-free mother characterized by Hoffman and previously discussed (see page 87). Although these conclusions are a jump from the data, they provide a plausible explanation worthy of further testing. The study actually showed daughters of f.t. and p.t. working mothers to be more active than those of n.w. mothers and to more frequently choose their mothers as models. Differential patterns of activity, autonomy, and independence were evident between lower class f.t. girls and the other three groups. No consistent differences on any of the variables were found for males.

Farley (1968), however found contrary results on activity among college students who reported whether their mother worked while they were in school. She found that males with working mothers tended to participate more in societal life, measured by attendance at a teach-in and petition-signing, while females with working mothers participated less. The failure to provide significance tests in this study makes interpretation difficult since the differences presented range from 0 to 19 per cent. It is not clear when the mother worked and whether or not she worked full-time. Resolving the differences between this study and Douvan's is also difficult because Farley did not block on social class, and the father's income was higher in housewife mother families in his study.

Attitudes. The final series of studies of adolescents deals primarily with attitudes. Smith (1968), using questionnaire responses of high school girls, concluded that: daughters of working mothers express more favorable attitudes toward combining marriage, motherhood, and a career; nonwhite girls are more likely to express such favorable attitudes than white girls; class was not a significant factor in these attitudes; and daughters of working mothers were more accepting of their mothers as "homemaking models."* Banducci (1967) similarly found that daughters of working mothers more frequently planned to combine the homemaker and worker roles, irrespective of SES; and King, McIntyre and Axelson (1968), using questionnaires completed by junior high school students, found that mother's employment was associated with greater acceptance of a wife's employment for males and females. Females with housewife mothers showed greater acceptance than males with housewife mothers.

All of these studies on attitudes relate to Douvan's previously described hypothesis that working mothers can serve as a model for their daughters. Specific tests of her hypothesis are not possible since the samples were not appropriately divided, but her conclusions receive some support. Moreover, these studies suggest possible reasons for differential sex effects. A more detailed account of sex-typing and the mother as a role model is necessary to further understand this relationship.

Adolescent studies summary. There is some evidence of differential attitudes and achievement of working and non-working mothers' children, with the effect different for males and females. Although some differential personality and activity patterns were also shown, there is no clear evidence for disturbance or maladjustment among children of working mothers.

CONCLUSIONS AND IMPLICATIONS

General results. The situation is even less clearcut with respect to maternal employment than the somewhat inconsistent findings summarized by Stolz (1960). She found no relation between maternal employment and delinquency, adolescent high school grades, and dependent-independent behavior. She did find more reported adolescent delinquency with maternal employment, but controlling for demographic variables eliminated this result. Elementary school children of working mothers were rated as lower in intellectual performance by teachers who knew the mother's work status. Finally, underlying characteristics of the mother may influence her attitude toward work and children with consequent effects on the children's behavior.

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* "Homemaking models" were not further defined in this brief write-up of the study.

Because of the complexity of the studies reviewed, it no longer seems possible or realistic to conclude with a list of dependent variables related and unrelated to maternal employment as Stolz did. The most important steps forward in this area are the recognition of differential sex and social class effects, as well as differential effects arising from the attitudes and behavior of the working mother and the nature of the substitute care, rather than dealing with the global independent variable, working versus non-working mothers.

It is clear that the study of the effects of maternal employment must be separated from the research on maternal deprivation where institutionalized children have primarily been studied. Although more direct study of preschool children with working mothers is necessary, the literature thus far, including the indirect evidence from Israel and Russia, indicates no harmful effects where adequate substitute care is provided. Future studies, should, where possible, include long-term follow-up of children whose mothers worked before the children entered school. No consistent effects of maternal employment have been found with school age children, although both statisfied working and non-working mothers appear to be "better mothers" than their dissatisfied counterparts. Similarly, adolescent children of working mothers are not consistently disturbed or maladjusted. However, there is some evidence that lower class children, especially boys, of working mothers show higher school achievement than those of non-working mothers, while the reverse relationship holds for upper middle-class children. Differences in attitudes and activity of children with working and non-working mothers have not been consistent, but results thus far suggest that studying this relationship within a framework of sex-role typing effects might be useful. Such studies cannot determine cause and effect since the researchers cannot manipulate which mothers work. Therefore, care must be taken in using conclusions about positive or detrimental effects of maternal employment on children to encourage or discourage mothers interested in working. Until causation can be shown, there is danger in drawing implications for relevant social action from these studies.

Future research. In addition to defining independent variables more explicitly, it would be desirable to use more observational technqiues and the recently developed interaction techniques (see Waxler and Mishler, 1971), in addition to the paper and pencil procedures reported here. More attention should be focused on the underlying processes involved in the interactions of mothers and children which affect children, rather than merely relating the independent variable, maternal employment to the dependent variables. Douvan's conclusions are an attempt at such explanatory processes, but studies should be designed to test such hypotheses, rather than to arrive at them *post-hoc.* In addition, moving away from dependent variables showing good or bad effects, e.g. adjustment versus maladjustment, to those studying differential personality styles or behavior, as Moore, for example, did (see page 83), is important for the understanding of processes.

One final area mentioned by Stolz, and not really noted since then, is the effect of the cultural milieu on the process of family interaction. Stolz, in her final summary, eliminated research before World War II because of the changing environment.

Today attitudes toward maternal employment are changing rapidly. Rapoport and Rapoport (1969), in their study of dual-career professional families noted the increasing emphasis on partnership in family life and the awareness on the part of such families of possible effects on their children. Rossi (1965) suggested that such knowledge causes guilt on the part of working mothers. DeRham (1965) noted that some guilt-ridden professional women overcompensate and become overprotective mothers. She further stated, "*this problem, of course, would never arise if the mothers were not made to feel guilty about their work in the first place through cultural pressures*" (p. 135). Thus, one reason for the lack of deficiency among kibbutz-reared children may be the acceptance of maternal employment. Rabin (1964) in interviews with kibbutz mothers found that most were fully satisfied with the collective education of their children. Thus, cultural acceptance can mitigate guilt, and possibly alleviate some of the negative effects of maternal employment. On the other hand, guilt may be one of the factors in bringing about increased mother–child interaction when the mother works.

In any event, further studies of maternal employment must take into account the cultural attitudes toward such employment. According to extensive interviewing in 1962, reported by Ruderman (1968), this milieu was still primarily negative. Account must also be taken of the mother's reference group—do most of her friends work?—and the father's attitudes and related behaviors which have been neglected for the most part. Will the current rise of the women's liberation movement mediate effects on children of those involved, for example? All of these are relevant variables in understanding the family interaction process related to maternal employment, and it is this process which should be the focus of future research.

SUMMARY

Various effects of maternal employment on infants, preschool children, school age children and adolescents were reviewed. The importance of differential effects according to sex and social class was noted, although many studies by failing to control for these variables may have obscured effects. Adequate substitute care is important in alleviating possible ill effects, and satisfaction of the mother whether or not she works, is crucial in determining effects. Future work should deal more with additional processes which may mediate effects of maternal employment. Neglected mediators which might be studied further include the cultural milieu, maternal characteristics such as achievement motivation and sex-role typing, and the family interaction process, including the husband's attitude toward the wife's work.

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CHILDREN WHO HAVE BEEN "IN CARE" —AN EPIDEMIOLOGICAL STUDY

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INTRODUCTION

AT ANY one time there are approximately 70,000 children in local authority residential care in England and Wales. This represents a small group of children who are permanently in care and a much larger group admitted for short-term care only. There are approximately 50,000 admissions each year, over half because of the mother's confinement or physical illness (Home Office, 1970).

Children in long stay institutions have long been of interest to psychiatrists and there are many papers describing the high prevalence of psychiatric disturbance seen in such children—although few of these do so on the basis of controlled studies (e.g. Pringle and Bossio, 1958; Wolkind, 1972; Yule and Raynes, 1972). It has been shown that children admitted to care because of confinement of their mothers come from families where there have been considerable difficulties in relationships and child rearing (Schaffer and Schaffer, 1968). Little is known, however, about the later psychiatric status of such children, although Mapstone (1969) has reported that children from the National Child Development Study who had been in care showed a high rate of poor reading ability and poor social adjustment in the classroom.

Because most studies have been concerned with children who have been in care for *long* periods, it has frequently been assumed that the experience of being "in care" is itself the harmful influence. Without knowledge of the prior and subsequent family life experienced by children taken into care, this is an unwarranted assumption. Different sorts of adverse experiences often go together, but if preventive action is to be effective it is essential to determine *which* experience has *which* effects (Rutter, 1972). One way of examining these issues is to determine the psychiatric state and family circumstances of children admitted into short-term care using methods which allow comparison with other groups. An opportunity to do this occurred as a result of an epidemiological investigation of psychiatric disorder in children in two communities.

METHOD

In the Isle of Wight in 1969 and in an inner London borough in 1970, all children in the 10- to 11-year-old age group were screened by means of teachers' question-

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naires (Rutter, 1967) for behaviour problems in the classroom. In both communities there was a response rate of over 99 per cent. In each case a group of children selected on the basis of the teachers' questionnaire as showing difficulties* and a randomly selected control group were more intensively studied. The parents of the selected group were interviewed and detailed information was obtained about the family and the parental relationship. Using a method of known reliability and validity (Rutter and Brown, 1966) a rating of the parental marriage was made. During the interview, details of all the child's separations from the parents were obtained and any reception into local authority care was recorded if it had lasted for as long as one week. Placement either with foster parents or in a children's home was counted for this purpose. During the same interview systematic information was obtained on the child's behaviour, emotions and relationships. On this basis a diagnosis of psychiatric disorder was made according to tested criteria (Graham and Rutter, 1968).

In short, three groups were available for comparison: a randomly selected control group, a group of children deviant on the teachers' questionnaire (hereafter called the "deviant" group), and a group of children deviant on the questionnaire for whom a diagnosis of psychiatric disorder was made on the basis of a detailed parental interview.

RESULTS

TABLE 1. PSYCHIATRIC DISTURBANCE AND EXPERIENCE OF CARE

	General population control group (excluding deviant children)		Children deviant on teachers' questionnaire (with parental interview)		Children with psychiatric disorder	
	N	%	*N*	%	*N*	%
Isle of Wight						
Children been "in care"	2	(2·2)	12	(12·9)*	6	(16·7)**
Total group	92		93		36	
Inner London Borough						
Children been "in care"	1	(1·3)	15	(10·1)***	13	(20·3)****
Total group	80		148		64	

* Significant difference for control group: $\chi^2 =$ 6·16, 1 *d.f.*, $p < 0{\cdot}05$.
** Significant difference for control group: $\chi^2 =$ 6·97, 1 *d.f.*, $p < 0{\cdot}01$.
*** Significant difference for control group: $\chi^2 =$ 5·00, 1 *d.f.*, $p < 0{\cdot}05$.
**** Significant difference for control group: $\chi^2 =$ 12·63, 1 *d.f.*, $p < 0{\cdot}001$.

Of the Isle of Wight children deviant on the teachers' questionnaire, 13 per cent had been "in care" for at least 1 week at some time in their life, compared with only 2 per cent in the randomly selected control group. For the purposes of this comparison, the deviant children in the control group were omitted in order to eliminate overlap between the groups. The findings for the inner London borough were similar: 10 per cent of deviant children had experienced care as against 1 per cent of the controls. Both differences were statistically significant at the 5 per cent level.

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* Because the number of children deviant on the teachers' questionnaire was large, a random sample of deviant children was selected for interview from the total group of deviant children.

Of the 27 deviant children who had been in care, 23 showed an antisocial disorder (including mixed disorders) and only 4 showed a neurotic disorder. Most of the deviant children who had been in care were boys (23 out of 27). There was 1 girl in the Isle of Wight sample and 3 in the London sample. The teachers' questionnaire designation was chosen as the main measure of deviance as it was entirely independent of the information on the children's admission into care. In most cases the period "in care" was quite brief and took place at an early age (see below) so that it is likely that the teachers were ignorant of its occurrence. Where the questionnaires were completed without knowledge of the child's early life experiences, the ratings could not be due to the teachers' expectations of deviance.

TABLE 2. ESTIMATED TOTAL NUMBER OF DEVIANT CHILDREN WITH EXPERIENCE OF CARE

	Total children deviant on teachers' questionnaire (a)	Deviant children with parental interview (b)	Deviant children been "in care" (c) No.	(d) %	Estimated total no. deviant children been "in care" (d) × (a)
Isle of Wight	136	93	12	12·9	18
Inner London Borough	322	148	15	10·1	33

While free of criterion contamination, the questionnaire ratings were necessarily crude. Accordingly, the deviant children were further investigated using detailed systematic information from parents. On this basis a smaller group of children with a handicapping psychiatric disorder was identified. Among the Isle of Wight children with psychiatric disorder 17 per cent had been in care, and among the London children with psychiatric disorder 20 per cent had been in care. Both rates were significantly different from the rates in the control groups. It may be concluded that, however measured, behavioural deviance is strongly associated with the prior experience of being "in care".

TABLE 3. ESTIMATED TOTAL NUMBER OF CHILDREN WITH EXPERIENCE OF CARE

	(a) Total population No.	(b) % of children in total general population control group who have been "in care"	(a) × (b) Estimated total no. children been "in care"
Isle of Wight	1278	(2·0)	26
Inner London Borough	1689	(3·1)	52

These figures show the high proportion of deviant children who have been in care. In order to assess the clinical meaning of the association it is also necessary to examine the association the other way round by asking what proportion of children experiencing care later show deviant behaviour. Some estimate of this figure can be obtained from Tables 2 and 3. Table 2 shows the estimated total number of 10 to 11-year-old deviant children in the two communities who have been "in care" for at least 1 week. Column (a) shows the total number of deviant children, and (b) shows the randomly selected number of these for whom a parental interview was obtained. Column (d) shows the proportion of deviant children who have been "in care". An estimated total number of deviant children who have experienced care can be obtained from the product of (d) and (a). Table 3 similarly estimates the total number of children (deviant plus non-deviant) in the two communities who have experienced care by multiplying the total number of children for each population by the proportion of children in each control group who have been in care.

Pooling the two groups it may be determined that there are an estimated 78 (26 + 52) children who have been in care, of whom 51 (18 + 33) show deviant behaviour. As already shown, most of the 51 deviant children will be boys. The expectation is that there should be a roughly equal sex ratio in the 78, as the Home Office figures (1970) show that 45 per cent of children in care are girls. It may, therefore, be inferred that most boys who have experienced a period in care will later show deviant behaviour (usually of an antisocial type) in school. In contrast, few girls will show such a disturbance. This conclusion is reinforced by the similar male preponderance among deviant children who have experienced care in the two communities.

TABLE 4. REASON FOR ADMISSION INTO CARE. (CONTROL AND DEVIANT GROUPS COMBINED)

Reason	Isle of Wight	Inner London Borough
Mother's confinement	1	4
Physical illness mother	6	2
Mental illness mother	4	3
Awaiting adoption	—	1
Mother unable to cope	2	1
No family home	—	1
Illegitimate and fostered	1	1
Not known	—	3
Total	14	16

As others have shown (Schaffer and Schaffer, 1968; Mapstone, 1969), children admitted into care often come from disturbed backgrounds and to evaluate the significance of the episode in care itself it is necessary to assess the children's experiences before and after the period in care. Table 4 shows the reasons given by the parents for the children going into care.* In two-fifths of the cases the immediate reason was the mother's confinement or physical illness. In a quarter, the children were admitted because of maternal mental illness and in the remainder the child was illegitimate or the family were not coping for one reason or another.

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* In this and all subsequent tables the control and deviant groups have been combined to provide the total number of children in care in the samples studied.

TABLE 5. AGE AT ADMISSION INTO CARE

Age	No.
Under 2 years	11
Over 2 but under 5 years	4
5 years and over	14
Not known	1
Total	30

TABLE 6. DURATION OF PERIOD "IN CARE"

Duration	No.
Under 2 weeks	5
2–4 weeks	6
1–6 months	11
Over 6 months	5
Not known	3
Total	30

Half the children had been admitted into care before the age of 5 years and in a third of cases this had happened during the first 2 years. However, in most cases the period in care was quite short; in over a third the care lasted less than 1 month and in over two thirds it lasted less than 6 months.

TABLE 7. FAMILY SIZE WHEN CHILD AGED 10 to 11-YEARS AND EXPERIENCE OF CARE

Family size	Pooled control groups (excluding children been "in care")	Pooled "in care" groups
1–3 children	116	8
4 or more children	74	22**
Total	190	30
	(+ 3 not known)	

** $\chi^2 = 7{\cdot}04$, 1 *d.f.*, $p < 0{\cdot}01$.

TABLE 8. PARENTAL MARRIAGE RATING WHEN CHILD AGED 10 to 11-YEARS AND EXPERIENCE OF CARE

Marriage rating	Pooled control groups	Pooled "in care" groups
"Good"	122	7
"Fair–poor"	45	13
"Very poor" or broken	22	10***
Total	189	30
	(+ 4 not known)	

*** $\chi^2 = 19{\cdot}53$, 2 *d.f.*, $p < 0{\cdot}001$.
χ^2 for linear trend $= 16{\cdot}19$, 1 *d.f.*, $p < 0{\cdot}001$.

Apart from this limited information little is known about the children's early life experiences, but more systematic information is available on current family circumstances. Table 7 shows that 67 per cent of the children experiencing care were living in families with four or more children compared with only 39 per cent of the general population control group. This excess of "in care" children living in large families is significant at the 1 per cent level. This association is probably meaningful in view of the evidence from other studies that large family size is associated with juvenile delinquency (West, 1967). The mechanism involved in the association remains unknown.

The parental marriage was rated on a 6 point scale. For present purposes the ratings were collapsed into three categories: "good" (1 and 2), "fair-poor" (3 and 4) and "very poor" (5 and 6). Broken marriages were included in the last group. It may be seen from Table 8 that the great majority (77 per cent) of the children who had been in care were currently living in families where the parents' marriage was "fair-poor" or worse. In contrast most of the control children were in happy families with only a third who had parents with a "fair-poor" marriage or worse. Again, the association probably reflects a currently disturbed family situation which played a part in the genesis of the deviant behaviour. Marital discord has been shown in other studies to be strongly associated with antisocial behaviour in the sons (Rutter, 1971).

It may be concluded that years after their brief period "in care" most of the children are still living in adverse circumstances of a kind known to lead to deviant behaviour. Less certainly, it may also be concluded that the children came from a disturbed home background even *before* the period in care.

DISCUSSION

In both control groups very few children had been in care so that the estimated prevalence rates must be treated with great caution. However, the figures which show a higher rate for the Inner London Borough are in keeping with national rates and there is good evidence from other sources that the two-fold difference in rates between Camberwell and the Isle of Wight is valid. Mapstone (1969) found that some 2 per cent of 7-year-old children in the National Survey had been in care. The difference between the two communities can best be gauged from the Home Office figures (1970). These refer to children *currently* in care rather than those ever-admitted into care so the absolute rates are at a lower level, but the relative difference is as shown by our figures. In the London borough, of which the community studied constitutes half, the rate was 12·5 per 1000 in 1970, over double that for the Isle of Wight (4·3 per 1000) and for England and Wales as a whole (5·3 per 1000).

In both communities there was a strong and statistically significant association between a period "in care" and behavioural disturbance as shown both at home and at school. Over one in ten of the children with a deviant score on the teachers' questionnaire had had at least one week in a Children's Home or foster home—a rate several times that in the control groups. The association was much more marked for boys than for girls. The association was even stronger with respect to psychiatric disorder diagnosed on the basis of a parental interview. Over one in six of the children with psychiatric disorder had been "in care".

The questions raised by this finding are whether it is the period "in care" which itself leads to the disorder and why it is that boys but not girls are adversely influenced in this way.* In considering the ill-effects of long periods in Children's Homes most emphasis has been laid on the "maternal deprivation" resulting from institutional care during the early years of life (Ainsworth, 1962). This would seem to be an inadequate explanation for the antisocial behaviour on the boys we studied as most of the children had been "in care" for only a few weeks and half the children had not been admitted into care for the first time until after the age of 5 years. That the psychological mechanisms leading to disorder in these children are different from those in children spending years in institutions is also suggested by the sex difference. In this group of children who spent short periods "in care" most of those who developed antisocial disorder were boys. With *long-term* care, in contrast, girls seem to be at least as susceptible to ill-effects as are boys (Yule and Raynes, 1972; Wolkind, 1972).

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* Although girls seem less susceptible to ill-effects as shown during childhood, there might be latent effects not manifest until late adolescence or adult life. There are no data on this possibility.

Accordingly it is necessary to examine the children's experiences before and after care. There is little direct information on the family conditions before care but for at least half the children the reason for care had been family difficulties or mental disorder in the mother. Other studies have shown that even when children are ostensibly taken into care because of their mother's confinement there have frequently been considerable difficulties in family relationships and in child-rearing (Schaffer and Schaffer, 1968). Furthermore, children admitted into care often came from families disadvantaged in other ways (Mapstone, 1969).

More information is available on the children's family circumstances after care. At the time of study, when the children were aged 10 to 11 years, two thirds were in families where there were four or more children compared with two-fifths in the control group. Less than one in four were living in families where the parents had a harmonious marital relationship compared with nearly two thirds of the control children. In short, even after returning home from care, most of the children were living in family conditions known to lead to antisocial disorder (Rutter, 1971, 1972). It would appear that the short period spent in a foster home or institution was no more than a brief episode in a long history of deleterious influences acting on the child. Whereas the short experience of being "in care" may have had some effect, it is probable that the long exposure to family discord and other disadvantageous living conditions was more important. Even with *long* periods in institutional care, family influences prior to admission play some role. In children living in a long-stay Children's Home, antisocial behaviour was found to be associated with coming from a large family and with aspects of the parental relationship prior to admission rather than with the length of institutional care (Wolkind, 1972).

The reasons why boys should be more susceptible to the adverse influences associated with short-term admission into care are not known. However, it seems that there may be a general tendency for boys to be more vulnerable to the effects of family discord as the same sex difference has been found in other studies (Rutter, 1970). Whereas this is in keeping with the well known greater vulnerability of boys to all forms of physical stresses (Rutter, 1970), it should not necessarily be assumed that boys are more likely to be harmed by all types of psychological stress. As already noted, girls are as often damaged as are boys by the factors associated with *prolonged* institutional care. In this connection, it is perhaps noteworthy that three of the four girls in the present study who showed disorder had been admitted into care below the age of 1 year (as against only 5 of the 27 boys), and two of them had remained in care for some years.

These findings raise both theoretical and practical issues. It is well established that both antisocial disorder and frank delinquency are much commoner in males, although why this is so is unknown. The present findings suggest that the aetiological mechanisms also may not be the same in the two sexes. In boys, the association between family discord and antisocial behaviour is well established although exactly *how* the association is mediated remains uncertain (Rutter, 1971, 1972). Seriously delinquent girls, too, frequently come from a very disturbed family background but the psychological mechanisms appear different. Discord, as such, seems to be less deleterious but an institutional upbringing may be more harmful. Why this should be so is quite unknown, nor is it evident what types of family pathology lead to antisocial disorder in girls.

On the practical side, the findings emphasise that children experiencing short-term institutional care are at risk for antisocial disorder, not so much because of the effects of the care *per se* but rather because such children are liable to come from disturbed families. It is, of course, important that everything possible should be done to improve the quality of care provided in Children's Homes and in foster homes, but it is evident that that is not enough. Families seeking short-term placement for their children will frequently need help long after the crisis leading to placement is over. The prognosis for children with an antisocial disorder is poor (Robins, 1966, 1971) and there is a need for trials of preventive treatment. Our findings suggest that boys admitted to short-term care would be an important group to study in this context.

SUMMARY

An epidemiological study of psychiatric disorder among 10 to 11-year-old children in two communities showed a strong association in boys between antisocial disorder and a history of a short period in foster-care or in a Children's Home. This association was much less evident in girls. At the time of study, years after the period "in care", most of the children were living in large families characterised by parental discord. It is suggested that it is this long-term family disturbance which leads to the antisocial disorder rather than the short-period of care *per se*. The reason for the sex difference in susceptibility to family discord requires further study. The findings also suggest the need for preventive treatment for families seeking short-term placement "in care".

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THE HIGH LANDS DEPENDENCY QUESTIONNAIRE (H.D.Q.): AN ADMINISTERED VERSION FOR USE WITH THE MOTHERS OF SCHOOL CHILDREN

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A questionnaire for the measurement of *dependency* in children of junior and secondary school age is presented. It is intended for clinical use in child psychiatry. Construct or factorial (Guildford, 1965) validity is reported and some tests of reliability and validity are given.

DEPENDENCY

The term *dependency* has been used in connection with a child's attachment to, and reliance on, other people; two sorts of dependency, "person-oriented" and "task-oriented", have been described (Bandura and Walters, 1963; Ainsworth, 1969). Attachment between child and mother is shown by physical contact, proximity, affectionate interchanges and the effects of temporary separations (Berg, 1966; Berg *et al.*, 1966; Bowlby, 1969). Reliance on mother is shown by assistance with personal activities such as dressing, washing or eating and lack of participation in household tasks. Some definitions of dependency include negative attention-seeking behaviour (Bandura and Walters, 1963), but this is excluded from consideration here because of its aggressive connotations and lack of association with other forms of dependency (Sears *et al.*, 1966).

Cultures vary in the extent to which they encourage independence training and this has been found to influence childhood dependency (Whiting and Child, 1953), but the attitudes and child-rearing practices of mothers have not been shown to influence their children's behaviour in any straight forward way (Sears *et al.*, 1966). Age is obviously an important variable affecting dependency: the more passive manifestations, such as staying close to mother, predominate at about two years of age, whereas the more active and verbal forms, such as seeking help and reassurance, occur more noticeably at about five years of age (Heathers, 1953). In an assessment of dependency in adolescent boys, physical contact was not asked about at all (Bandura and Walters, 1959).

Dependency has been defined (Bandura and Walters, 1963) as behaviour eliciting caring responses in others. It has been studied by direct observation of children in natural (Sears *et al.*, 1966) and experimental situations (Heathers, 1955), and by interviews with parents (Sears *et al.*, 1957) and children (Bandura and Walters, 1959). The behaviour looked at in these investigations sometimes suggested the existence of a unitary personality trait (Beller, 1955; Bandura and Walters, 1959); although other studies failed to support such a view (Sears *et al.*, 1966).

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Disturbed dependency behaviour has aroused much clinical interest among child psychiatrists who are concerned with the quality of relationships formed by children suffering from emotional disorders. This applies particularly to the subject of maternal deprivation and its effects on the child (W.H.O., 1962). It also applies to so-called maternal overprotection (Levy, 1943) in so far as some children attending clinics seem always to be with their mothers and to have things done for them which they are capable of doing themselves; a state of affairs which has been attributed to mothers not wishing their children to achieve independence appropriate for their age (Kanner, 1957). An excessive degree of dependency has been said to exist in the condition of school phobia (Johnson *et al.*, 1941).

A rudimentary form of the questionnaire described in this paper was used to measure dependency in two subgroups of school phobic children (Berg *et al.*, 1969) although no control group of normal children was available with which to compare the results.

THE HIGH LANDS DEPENDENCY QUESTIONNAIRE

The questionnaire is presented and the method of administration is described in Appendix 1. Most questions are concerned with the relationship between child and mother, and they attempt to cover the various forms of dependency discussed above: assistance with personal activities, disinclination to participate in household tasks, reluctance to be away from home, seeking approval and showing affection.

Since factual information about recent events is required, specific instances are asked about as precisely as possible and scored on a frequency scale. An interviewing technique which is direct, brisk and searching is used; the procedure lasts only about a quarter-of-an-hour. This has the advantage of reducing fatigue and possibly overcoming respondent bias by introducing the element of surprise (Rutter and Brown, 1966; Oppenheim, 1966). What is in fact measured depends on such factors as the inclinations of the child, the attitudes and behaviour of the mother and parental standards of acceptable conduct. Rather than attempt to assess these variables separately, as has been done (Bandura and Walters, 1959), it was decided to concentrate on their end result, actual observable behaviour.

THE NORMAL SAMPLE

One hundred and sixteen children were drawn from the normal school population. Three schools were selected in Otley and Guiseley, situated in the West Riding of Yorkshire; 48 junior, 36 secondary modern and 32 grammar school children were included in the survey.

PROCEDURE

Names were selected in an unbiased fashion from school registers, by taking every fourth, fifth or sixth child from the alphabetically arranged list depending on the size of the class. Homes were visited during evenings and weekends. The questionnaire was administered to the mothers of the children. Individuals were grouped according to sex, age (exact age in years as midpoint of category), and social class (three groups based on the Registrar General's classification (1960):

1 = I or II, 2 = III and 3 = IV or V). In the junior group the random sample was stratified to produce two individuals for each cell: age groups 8, 9, 10 and 11, boys and girls, social classes 1, 2 and 3. The secondary modern pupils were 2 per cell also for ages 12, 13 and 14, boys and girls and social classes, 1, 2 and 3. Grammar school children were 2 per cell for ages 12, 13, 14 and 15, boys and girls, and social classes 1 and 2*. Individuals could only be placed definitely in the appropriate social class category at the time of the interview for want of precise advance information; as each cell of the table was filled further families encountered in the same category were not used. There were two groups of interviewers; (1) two social science students who worked during the first 3 months of 1969, and (2) two of the writers (EW and IB) together with a social administration student who continued over the subsequent 6 months.

RELIABILITY

The usual way of assessing reliability of a questionnaire such as that described in this paper is to estimate how consistent are the results obtained by independent observers either during the same interview or on different occasions (Guildford, 1965).

In constructing the H.D.Q. and providing instructions for its use, care was taken to avoid ambiguity in the wording of questions and to reduce respondent and interviewer bias† by appropriate means (Oppenheim, 1966), so as to increase the reliability of the interviewing procedure. Since actual observable events, mostly involving the mother–child relationship, are being measured, focussing on the previous three months and using carefully defined frequency categories probably increased the reliability also (Rutter and Brown, 1966).

Ten joint interviews were carried out by each group of interviewers. There were two observers, one asked the questions but both of them scored the replies independently. In group (1), there were no disagreements in eight interviews and only two disagreements involving adjacent frequency categories in each of the other two interviews. In group (2), there were no disagreements in seven interviews and one, two and three failures to correspond, also involving adjacent frequency categories, in each of the other three interviews respectively.

Only seven retests were carried out in the normal school sample, owing to difficulties in arranging a second interview with the same family in the time available for the survey. Product–moment correlation coefficients were calculated between scores obtained from seven interviews of one of the writers (EW) and repetitions by another interviewer after an interval ranging from 14 to 50 days. The correlations were as follows: 0·97, 0·91, 0·90, 0·89, 0·88, 0·86 and 0·56. Further test–retest estimations were carried out on clinic cases, mostly neurotic problems, a composite correlation of $r = 0{\cdot}85$ (range 0·99–0·50) was obtained with 21 individuals.

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* Not 3 as insufficient individuals were available to complete the table.

† Further information on this can be obtained from IB.

ANALYSIS OF DATA

Question scores were punched on to 8 hole paper tape for processing on the University of Leeds, English Electric K.D.F.9 computer, using a system of standard programs (Hamilton *et al.*, 1965).

Principal component factor analyses were carried out separately on junior and secondary school data.

Preliminary factor analyses of the 23 questions had revealed high correlations between questions of apparently similar content and high factor loadings of them on the same components, indicating that face validity was reflected in construct validity. Plotting polar co-ordinates (Hope, 1968) and elementary linkage analyses (McQuitty, 1957) had also showed the existence of such clusters of questions. Scores on these questions of apparently similar content were subsequently combined by adding them together: 5, 6, 7 and 13 asking about mother–child affection; 8, 10, 18 and 23 concerned with verbal communication; 1 and 14 involving getting assistance; and 3 and 4 involving participation in household tasks (Question 15 was omitted as unsatisfactory). The resulting 14 variable correlation matrices (Table 1) were more suitable for factor analysis as fewer variables of greater variance intercorrelated to only a moderate extent (Guildford, 1965).

TABLE 1. CORRELATION MATRIX OF JUNIOR AND SECONDARY SCHOOL CHILDREN

Junior—boys and girls

Questions	*Questions* 1 14	5 6 7 13	8 10 18 23	2	3 4	9	11	12	16	17	19	20	21	22
1, 14	100	17	15	24	–02	18	17	06	–06	–15	06	25	12	–16
5, 6, 7, 13	–12	100	47	35	–23	–00	08	–08	10	17	–11	–13	38	16
8, 10, 18, 23	00	31	100	15	–31	17	–05	–27	16	22	–17	–09	07	00
2	–17	20	28	100	–25	00	–10	–33	–00	17	–08	–09	33	25
3, 4	15	–11	–15	–11	100	25	07	29	–19	02	04	13	04	00
9	10	10	21	22	28	100	34	03	–16	–04	–16	15	01	–11
11	06	–06	42	–29	10	–09	100	06	16	–23	06	17	13	–14
12	16	23	08	–01	–14	06	11	100	–12	07	17	–05	14	–13
16	–07	–17	–36	–03	–09	–15	27	01	100	01	–14	–01	14	11
17	14	02	21	09	13	10	01	15	–09	100	–16	14	33	31
19	–14	–01	18	08	10	25	–08	–14	–18	08	100	–26	–02	–15
20	12	11	19	11	18	10	–10	04	–30	15	03	100	15	30
21	16	13	15	23	–03	22	–16	16	–08	20	–08	25	100	26
22	05	13	17	03	–17	–08	–04	27	–19	07	–14	09	13	100

Secondary (grammar and secondary modern)—boys and girls.

The results of carrying out principal component factor analyses on the junior and secondary groups, separately, are shown in Tables 2 and 3.

TABLE 2. PRINCIPAL COMPONENT ANALYSIS
JUNIOR SCHOOL CHILDREN (BOYS AND GIRLS)

	Latent vectors (Components)					
	1	2	3	4	5	6
	Factor loadings					
Questions						
1, 14	0·15	–0·44	–0·48	0·17	–0·20	0·38
5, 6, 7, 13	0·69	–0·06	–0·24	0·33	0·06	–0·20
8, 10, 18, 23	0·60	0·08	–0·38	–0·11	–0·15	–0·46
2	0·65	0·03	–0·09	0·19	–0·28	0.42
3, 4	–0.44	–0·50	0·31	0·10	–0·14	–0·15
9	–0·04	–0·61	–0·32	–0·22	–0·30	–0·32
11	–0·09	–0·54	–0·43	–0·05	0·48	0·02
12	–0·40	–0.31	0·21	0·54	0·13	–0·29
16	0·30	0·11	–0·06	–0·21	0·78	–0·08
17	0·46	–0·09	0·55	0·14	–0·15	–0·36
19	–0·34	0·18	0·15	0·61	0·08	0·25
20	0·09	–0·61	0·28	–0·43	0·03	0·31
21	0·51	–0·41	0·22	0·46	0·24	0·05
22	0·46	–0·10	0·60	–0·12	0·07	0·24
Latent roots	2·53	1·82	1·69	1·38	1·21	1·13

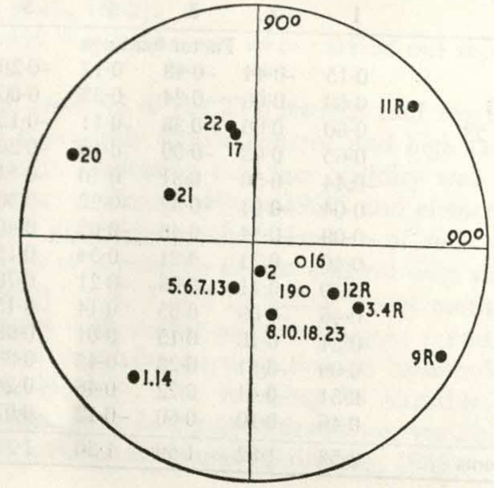
TABLE 3. PRINCIPAL COMPONENT ANALYSIS
SECONDARY SCHOOL CHILDREN—GRAMMAR AND SECONDARY MODERN
(BOYS AND GIRLS)

	Latent vectors (Components)					
	1	2	3	4	5	6
	Factor loadings					
Questions						
1, 14	0·08	–0·06	0·68	–0·14	0·23	0·19
5, 6, 7, 13	0·45	–0·29	–0·18	0·15	–0·43	–0·44
8, 10, 18, 23	0·73	–0·02	–0·24	–0·15	–0·08	0·23
2	0·50	0·03	–0·36	0·48	0·22	–0·04
3, 4	–0·02	0·59	0·51	–0·00	–0·07	–0·26
9	0·44	0·43	0·21	0·40	–0·17	–0·08
11	–0·52	–0·11	0·39	0·18	–0·45	–0·04
12	0·21	–0·59	0·32	0·20	–0·36	–0·06
16	–0·56	–0·16	–0·04	0·59	0·13	0·10
17	0·35	0·03	0·39	0·14	–0·12	0·55
19	0·22	0·57	–0·20	–0·02	–0·43	0·28
20	0·48	0·10	0·32	–0·23	0·17	–0·41
21	0·49	–0·18	0·28	0·35	0·40	–0·07
22	0·29	–0·56	0·09	–0·30	–0·10	0·05
Latent roots	2·54	1·69	1·63	1·17	1·08	0·95

The 14 variables were plotted on the surface of a sphere using the method of polar co-ordinates (Figs. 1 and 2).

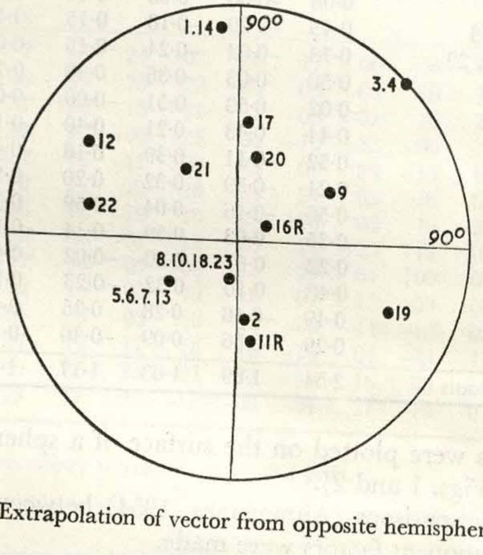
Mathematical comparisons (Ahmavaara, 1954) between junior and secondary school principal component factors were made.

Factor weights that can be applied directly to raw scores were obtained by a simple calculation from the factor loadings; they are given in *T* form (Tables 4 and 5) whereby a constant is added to the sum of weighted variables to produce an overall mean of 50 and *s.d.* of 10.



R—Extrapolation of vector from opposite hemisphere
O—Less than a third of total variance accounted for by the first 3 principal components

FIG. 1. Junior school children (boys and girls). Plot of 14 question variables on 3 components using the surface of a hemisphere (Projection: stereographic equatorial azimuthal).



R—Extrapolation of vector from opposite hemisphere

FIG. 2. Secondary school children (grammar and secondary modern—boys and girls). Plot of 14 question variables on 3 components using the surface of a hemisphere. (Projection: stereographic equatorial azimuthal).

TABLE 4. PRINCIPAL COMPONENT ANALYSIS
JUNIOR SCHOOL CHILDREN (BOYS AND GIRLS)

	Components 1		2	
	Actual	Approximate	Actual	Approximate
Questions	*Factor weights for raw data in T score form*			
1, 14	0·32	0	−1·34	1
5, 6, 7, 13	0·71	1	−0·09	0
8, 10 ,18, 23	0·69	1	0·13	0
2	2·55	4	0·19	0
3,4	−0·86	0	−1·37	1
9	−0·13	0	−2·56	2
11	−0·35	0	−2·81	2
12	−2·31	0	−2·50	2
16	1·02	1	0·51	0
17	1·70	2	−0·48	0
19	−1·41	−2	1·01	0
20	0·29	0	−2·81	2
21	1·51	2	−1·70	0
22	1·55	2	−0·47	0
Constants	38·83	50	89·08	50

TABLE 5. PRINCIPAL COMPONENT ANALYSIS
SECONDARY SCHOOL CHILDREN—GRAMMAR AND SECONDARY MODERN
(BOYS AND GIRLS)

	Components 1		2		3	
	Actual	Approximate	Actual	Approximate	Actual	Approximate
Questions	*Factor weights for raw data in T score form*					
1, 14	0·42	0	−0·52	0	5·77	11
5, 6, 7, 13	0·39	0	−0·39	1	−0·25	0
8, 10, 18, 23	0·57	1	−0·02	0	−0·29	0
2	1.76	3	0·17	0	−1·97	0
3, 4	−0·03	0	1·73	0	1·54	3
9	1·44	0	2·13	−5	1·09	0
11	−1·34	−2	−0·41	0	1·59	0
12	0·87	0	−3·64	9	2·09	0
16	−1·58	−3	−0·68	0	−0·16	0
17	1·28	0	0·16	0	2·25	5
19	0.93	0	3·61	−9	−1·30	0
20	1·48	0	0·47	0	1·56	3
21	1·22	0	−0·66	0	1·09	2
22	0·97	0	−2·81	7	0·44	0
Constants	33·35	50	64·33	50	30·36	50

Sets of approximate weights (Appendix 2) called subscale scores to differentiate them for the actual component scores, were also produced to simplify the process of calculating factor scores, from the raw data.

RESULTS

A cluster of variables concerned with *attachment to mother*: affection (5, 6, 7 and 13), communication (8, 10, 18 and 23) visits (2) and, less exclusively, closeness to home (17 and 21,) emerged in both junior and secondary school groups in relation to the first principal component in each case. Independence in travelling (11 and 16 negatively loaded) formed part of this cluster in secondary school children.

Most of the remaining questions referred to *reliance on mother* for dressing or washing (9, 20, 1 and 14) and jobs around the house (3 and 4). These variables were highly loaded on factors other than the first; mainly on the second component of the junior school group and on the third component of the secondary school children.

Component one of the junior group "correlated" 0·54 with component one of the secondary group; component two of the junior school children "correlated" 0·82 with component three of the secondary school children.

The first two principal components of the junior school group, accounting for 31 per cent of the total variance, and the first three principal components of the secondary school group, accounting for 41 per cent of the total variance, were tabulated, since this appeared to be the minimum required to bring out the main underlying tendencies in the data.

High correlations were found between subscale and component scores: the product moment correlation coefficients were, in the junior group 0·97 for the first component, and 0·96 for the second; and in the secondary group 0·87 for the first, 0·92 for the second, and 0·84 for the third.

The mean component scores of various sub-groups of children were compared using analysis of variance. In the junior group, the only consistent findings was that girls scored significantly higher than boys on the first component ($p < 0{\cdot}001$); age and social class did not appear to be important. In the secondary group, the only consistent findings were also sex differences; age, social class and school did not appear to influence the results. Boys scored significantly higher than girls on the second ($p < 0{\cdot}05$) and third components ($p < 0{\cdot}05$); although girls had higher mean scores on component one, this failed to reach statistical significance.

The first three principal components and the clusters of variables related to them did not become much more meaningfully aligned, either in the junior or the secondary school groups, by varimax rotation (Kaiser, 1958).

Further principal component analyses were carried out separately on the secondary school boys and girls*. In the girls, variables concerned with attachment to mother and independence in travelling were loosely clustered in association with the first principal component, and those concerned with reliance on mother were dispersed in relation to the second component. This separation of the attachment and reliance groups of variables was largely maintained in the boys, although affection emerged independently on a separate component.

Statistical comparisons of the principal components showed that the first component of the girls' group "correlated" 0·66 with the second component of the boys' group, and component two of the girls "correlated" 0·54 with component three of the boys. The first three components of the boys' group, accounted for 47 per cent of total variance, and the first three factors of the girls accounting for 44 per cent of total variance. Analysis of variance of the component scores failed to reveal any significant differences between age, school or social class groupings for either boys or girls.

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* Details can be obtained from IB.

VALIDITY

It has been repeatedly asserted that youngsters suffering from school phobia, even those of secondary school age, are overdependent on their mothers (Berg, 1970). Forty-two school phobic youngsters aged 11–15 admitted to a hospital in-patient unit had the H.D.Q. administered to their mothers around the time of admission. Component scores for the first and third components were calculated using actual weights and subscale scores were calculated using approximate weights (Table 5). The correlations between component and subscale scores in 19 school phobic cases looked at in another context, were $r = 0{\cdot}95$ for factor 3, and $r = 0{\cdot}51$ for factor 1*. The school phobic cases were compared to the 68 youngsters from the normal school population using one-way analysis of variance tests (Guildford, 1965).

Subscale scores. First component. The school phobic mean (S.P.M.) 47·8 was significantly less than the control mean (C.M.) 54·3; $s.d. = 10{\cdot}7$, $p < 0{\cdot}01$. *Third component.* The S.P.M. 88·6 was significantly greater than the C.M. 79·0; $s.d. = 15{\cdot}2$, $p < 0{\cdot}01$. No significant differences were found between the 58 boys and 52 girls, the 52 grammar school youngsters and 58 secondary moderns, or the 63 12- or 13-year-olds and 47 14- or 15-year-olds.

Component scores. First component. The S.P.M. 48·7 was less than the C.M. 50·0; but this did not reach significance $s.d. = 10$, $p > 0{\cdot}05$. There were no significant sex, age or school differences. *Third component.* The S.P.M. 55·9 was significantly greater than the C.M. 50·0; $s.d. = 10$, $p < 0{\cdot}01$. There was no significant sex or school differences but 12- and 13-year-olds ($n = 63$) had significantly greater mean values than the 14- or 15-year-olds ($n = 47$); $p < 0{\cdot}05$.

DISCUSSION

Although the main aim of the study reported in this paper was to elucidate fundamental patterns of behaviour shown by children in relation to their mothers of a kind commonly referred to as *dependency*, the results must be regarded as tentative since they are derived from only a single sample of subjects using just one set of questions (Cattell *et al.*, 1970). Nevertheless, the finding that a broad distinction should be made between variables apparently concerned with *attachment* and those seemingly connected with *reliance*, in both junior and secondary school groups, is encouraging as it confirms previous work (Bandura and Walters, 1963; Maccoby and Masters, 1970).

The normal sample was satisfactory for component analysis by virtue of its method of selection and composition, since it included boys and girls, a wide selection of age groups, different social classes and representatives from grammar as well as secondary modern schools in the older children (Cattell, 1952). The size of the sample appeared to be reasonable also, particularly as it was stratified. Also, the 14 variables employed covered several aspects of *dependency* as described in the relevant literature (Berg *et al.*, 1969). The fact that it was taken from the general population make the results particularly useful in the subsequent application of the questionnaire to clinical cases (McGuire, 1970). The statistical procedure used, of principal component analysis applied to a correlation matrix with ones in the main diagonal* proved to be effective as well. It was not found to be necessary to adopt any of the procedures for rotating factors, the use of which has engendered so much controversy (Hope, 1968) since the first components did not have the substantial positive loadings of all variables on them, which frequently occurs with this statistical method, probably because of rather low inter-correlations between variables to start with.

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* The low correlation for sociability may be explained by a divergence between at least two tendencies which have different emphasis in the factor and subscale scores.

All the components presented in the tables were considered significant on the Kaiser–Guttman test (Cattell *et al.*, 1970) since their latent roots were one or more. The first two or three components were, however, of most interest psychologically because the majority of variables were highly loaded on them, they accounted for a large proportion of the total variance and they could be used as polar co-ordinates; even so, some of the others were of possible value, for example in appraising independence in travelling employing the fifth factor in junior school children.

Age was not a significant variable distinguishing between factor scores when junior and secondary school children were looked at separately; there were no social class or school effects either, so that only sex differences had to be taken into consideration. *Therefore, in using the questionnaire, boys and girls are best considered separately.* In the factor analysis of personality test data, boys and girls commonly differ significantly in their mean scores on the resulting dimensions. Although similar factors often appear when the sexes are analysed separately, sometimes a few different traits emerge (Cattell, 1965; Cattell *et al.*, 1970). The differences which appeared when principal component analyses were carried out on the secondary school boys and girls as separate groups can probably be explained by a real difference between the sexes in the expression of affection towards mother. However, in view of the small number of individuals in each group, possibly resulting in factor instability, caution must be exercised in accepting this result as valid.

The two sets of approximate weights given for the junior group closely represented the actual weights of the first two components. They accounted for only about a third of the total variance but had the advantage of measuring two psychologically meaningful dimensions with a fair degree of accuracy. It would have been a simple matter to obtain approximate raw score weights for all six significant components which accounted for over two thirds of the total variance. They would have been made up of from one to four non-zero weights but would probably not have represented the actual weights as well as when only two sets were used. A compromise between these two extreme positions was adopted with the secondary school children in that the first three principal components accounting for between

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* The main diagonal contains the correlations between each variable and itself. Thus the values are all ones. Some factor analysts try to improve their results by putting a lesser value than one in the main diagonal called the communality, on the assumption that error peculiar to the variable can be reduced in this way.

40 and 50 per cent of total variance were used: the three sets of approximate weights represented the true weights reasonably well.

The error associated with individual responses to questions was probably reduced by asking mothers about actual observable events affecting the children, so called *L* data, and also by combining scores of several questions with a similar content, even though this was done to only a limited extent (Cattell *et al.*, 1970). Reliability was considered satisfactory. As far as inter-rater reliability was concerned, the virtually complete correspondence was not surprising since the method of administration involved discussion between interviewer and mother until the appropriate frequency category was selected. Test–retest reliability was usually high. The occasional correlation as low as 0·5 could be explained either by respondent error or a real change in dependency due for example to intercurrent illness or temporary emotional upset.

Attempting to attach names to particular components in order to indicate what a factor really measures in psychological terms is fraught with difficulties and must of necessity be tenuous until the questionnaire is used more extensively on different, so-called criterion, groups of individuals to see if children with an excess or deficiency of an attribute, which a factor is supposed to measure, score in the appropriate direction and also until cross-validation studies have been carried out employing other tests measuring relevant things. However, some evidence for the validity of the H.D.Q. was obtained from applying it to the school phobic cases. This condition is characterized by overdependency (Berg *et al.*, 1969). *The factor and subscale scores of the third component in the secondary group were nearly identical and appeared to measure reliance on mother. Both were raised in the children suffering from school phobia*. The first factor in the secondary school group seemed to be measuring sociability, including demonstrativeness in the mother child relationship and the ability to travel freely away from home. Scores on this component did not deviate in the school phobic group. The lower first subscale scores in the school phobic cases appeared to reflect a tendency concerned with travelling and communicating.

Objective methods for the assessment of emotional aspects of problems have not been commonly used in the practice of child psychiatry to augment the customary clinical approach despite evidence derived from general psychiatry to suggest that the accuracy of decisions about appropriate treatment and prediction of outcome would thereby be increased (Sines, 1970). It is hoped that the H.D.Q. will help to remedy this deficiency.

SUMMARY

A questionnaire concerned with *dependency* in the mother-child relationship, and intended for use in child psychiatry, was described. It was administered to the mothers of 116 randomly selected junior and secondary school children in the general population, stratified into age, sex, social class and school groupings, in order to investigate its reliability and construct validity as a basis for clinical use. The inter-rater and test–retest *reliability* seemed to be satisfactory. Principal component factor analyses were carried out separately on junior and secondary school children. At

least two meaningful dimensions were revealed; a factor concerned with *attachment* to mother and a factor more specific to the notion of dependency involving *reliance* on mother in practical matters. Sex differences of statistical significance were found between factor scores; and separate principal component analyses were referred to for boys and girls in the secondary school group. The calculation of factor (then called *subscale*) scores was made easier by the provision of approximate raw score factor weights. Some evidence for the *validity* of the questionnaire was provided when a group of school phobic cases was investigated.

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APPENDIX 1

THE HIGH LANDS DEPENDENCY QUESTIONAIRE

(for administration to mothers by an interviewer:
separate forms for boys and girls)

Front sheet

Name.................................. Address .... Date of Birth ....

School .... Occupation of father......... Diagnosis...........................

Date of completion .... Interviewer...

QUESTIONNAIRE (Boys version)*

L—Less than once a week or not at all
O—As much as once a week
B—Between once a week and once a day
E—As much as once a day
M—More than once a day

1	Do you wash or bath him? (exclude washing hair)	*L*	*O*	*B*	*E*	*M*
2	Does he go shopping or on visits with you? (*with*, not *for* you)	*M*	*E*	*B*	*O*	*L*
3	Does he make up his own bed or clear up his room?	*L*	*O*	*B*	*E*	*M*
4	Does he clear off the table or wash the dishes at home?	*L*	*O*	*B*	*E*	*M*
5	Does he come into your bed for company at night or early morning?	*M*	*E*	*B*	*O*	*L*
6	Does he come close to you for affectionate contact?	*L*	*O*	*B*	*E*	*M*
7	Does he kiss you (or you kiss him) on going out or coming in?	*M*	*E*	*B*	*O*	*L*
8	Does he talk his troubles over with you and ask your help about what is going on in the family?	*L*	*O*	*B*	*E*	*M*
9	Do you clean his shoes?	*M*	*E*	*B*	*O*	*L*
10	Does he talk things over with you and ask your help about what is going on at school? (exclude homework)	*M*	*E*	*B*	*O*	*L*
11	Does he go on a bus without you?	*M*	*E*	*B*	*O*	*L*
12	Does he do jobs to earn extra money outside home?	*M*	*E*	*B*	*O*	*L*
13	Does he kiss you, or you kiss him, on going to bed?	*L*	*O*	*B*	*E*	*M*
14	Do you give him actual help in putting on or taking off clothes?	*M*	*E*	*B*	*O*	*L*
15†	Does he cross a main road, that is a bus route, without you?	*M*	*E*	*B*	*O*	*L*
16	Does he go into the nearest town without you?	*M*	*E*	*B*	*O*	*L*
17	Does he spend time with you at home when he could go out?	*L*	*O*	*B*	*E*	*M*
18	Does he talk things over with you and ask your help with what is going on with his friends?	*L*	*O*	*B*	*E*	*M*
19	Do you take him breakfast, supper or drinks to bed when he is well?	*L*	*O*	*B*	*E*	*M*
20	Do you put out clothes for him that it would be possible for him to get himself?	*L*	*O*	*B*	*E*	*M*
21‡	Does he stay close to home, within two minutes walk away when outside with friends? (Do not include going to school, to town, using a bus)	*M*	*E*	*B*	*O*	*L*
22‡	When he goes out, does he tell you where he is going?	*M*	*E*	*B*	*O*	*L*
23	Does he talk things over with you and ask your help with what is going on with his friends and hobbies?	*L*	*O*	*B*	*E*	*M*

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* The only difference between the boys' version and girls' version is that "he" or "him" is replaced by "she" or "her".

† This question was considered unsatisfactory; it was not used in the factor analysis.

‡ These questions are difficult to score if the child does not go out. The dependency score was increased by one for each day the child remained at home, after the second, to a maximum of 4.

Method of administration

The information required by the front sheet is obtained. The mother is told that the questionnaire is mostly concerned with the relationship between her and the child under consideration. She is asked to indicate how often certain events actually occurred in a typical school week during the previous three months. She is informed that some questions might seem more appropriate for a younger or older child. Each question is read out in turn and answered before passing on to the next. If mother immediately responds to the effect that a particular event did not occur, the letter L is encircled. Otherwise the frequency categories are read out in the order given on the sheet. Following discussion between the interviewer and the mother as to which is the appropriate category, the corresponding letter is encircled. When the factual recordings are complete, the interviewer announces that they will go through the questionnaire again to record, not what actually happened as before, but what she would prefer to be the case.* The mother is reminded how she had replied to each question. If she had said that an event occurred less than once a week, she is asked if she would like it to occur more frequently. If she had indicated another category she is asked if she would prefer the event to happen more often, less often, or the same. The appropriate letter is underlined.

The questionnaire is scored in the direction of dependency as originally envisaged using a 5 point scale; questions 3, 4, 11, 12, 15 and 16 are scored $M = 0$, $E = 1$, $B = 2$, $O = 3$ and $L = 4$; the remainder are scored $L = 0$, $O = 1$, $B = 2$, $E = 3$ and $M = 4$. A scoring card with holes through which the circled letters and underlinings can be seen may be used; by employing rough weights as given in the paper, approximate factor scores can easily be obtained directly.

APPENDIX 2

APPROXIMATE WEIGHT NORMS (SUBSCALE SCORES)

	Factor 1		Factor 2		Factor 3	
	Mean	s.d.	Mean	s.d.	Mean	s.d.
Total secondary school group	54·3	10·7	100·7	20·0	79·0	15·2
Total junior school group	83·5	12·1	76·7	6·7	—	—
Total secondary group—boys only	52·2	10·7	97·4	20·5	81·9	17·9
Total secondary group—girls only	56·4	9·4	104·1	18·7	76·2	10·5

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* Discrepancies between preferred and actual scores will be the subject of another communication.

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THE DRAW-A-MAN TEST: A STUDY OF SCORING METHODS, VALIDITY AND NORMS WITH ENGLISH CHILDREN AT FIVE AND ELEVEN YEARS

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INTRODUCTION

This study of two samples of children at age five and eleven years, in the West Midlands, offers evidence of children's drawings of a man as measures of their intellectual maturity, using three different methods of scoring. The Harris revision (1963) of the Draw-a-Man (D-A-M) test, containing 73 scorable items instead of the 51 items of Goodenough's Scale (1926), extends the norms to older age groups. Children today, Harris reports, perform at a higher level on many items as compared with those on whom the test was standardised some forty years earlier. The revision was standardized on a more representative sample of American children than was available to Goodenough.

Harris offers also Quality Scales, for quick approximation to mental age, which are said to discriminate cognitive development about as adequately as Point Scales for children from 5- to 9- or 10-years of age. The Quality Scales are similar to those constructed by Burt (1921), who, using children's drawings of a man, selected a median sample drawing for each year and described its typical characteristics. Burt considered that although the results did not correlate highly with intellectual or educational ability, children's drawings of the human figure are useful to the trained observer because they do not depend on the acquired ability to manipulate abstract symbols. In his summary Harris says that the Revised D-A-M-test "provides a measure of intellectual maturity that correlates substantially with tests of so-called general intelligence and relates to the ability to do abstract thinking".

Besides the interest in norms of performance of English children, this investigation is concerned with comparison of the original and the revised systems of scoring, the reliability of the scoring methods, and the relationships between the D-A-M test and other measures of intellectual ability and educational achievement. Hereafter the methods of scoring will be named Goodenough Points, Harris Points and Harris Quality.

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SAMPLING AND METHODS

The 5-year-old sample

One group consists of 210 children in the age range 5 yr–5 yr 11 months, mean age 5 yr 4 months at the time of testing. All were subjects for the Neonatal Jaundice Research at the University of Birmingham, an interdisciplinary study of the psychological sequelae of jaundice at birth. They were selected from the total live births in a Birmingham maternity hospital over a two-year period. For this particular study, sub-samples from the original research were selected in order that the incidence of several important characteristics (sex, length of gestation, social class, parity, age of mother, multiple birth and presence of physiological jaundice) should correspond with the general population. The necessary statistics were obtained from the City of Birmingham Statistical Office and from maternity hospital figures (Wood *et al.*, 1962). Means and standard deviations obtained from these sub-samples of the original research were weighted according to their representation in the population in order to obtain estimates of the parameters.

A sample of children born in hospital is not equivalent to a random sample of children in the general population since hospital births are selected in respect of parity and difficulties of pregnancy and labour. Although the selection and weighting procedures have been followed with care, it is not claimed that the final results are truly representative of the general population of 5-year-olds: the nature and extent of the bias introduced by the sampling procedures is unknown and the incidence of some characteristics, such as difficulties of pregnancy and labour, cannot be adjusted. Slightly more children from social classes I and II are present than would be expected from local population statistics, and slightly too few from social classes IV and V. The mean I.Q. as measured by the Stanford–Binet, Form L-M, is 109 (*s.d.* 15), which is high, but evidence from a study of 11-year-olds (Phillips and Bannon, 1968), and from other sources, indicates that the mean I.Q. of British children on this test is higher than the American norms.

In addition to the D-A-M test and the Stanford–Binet Scale, the testing programme included the Experimental Edition of the *Illinois Test of Psycholinguistic Abilities* (McCarthy and Kirk, 1961), some results from which have been reported by Phillips (1968), the English Picture Vocabulary Test (EPVT) 1, and a test of ability to copy a series of geometric figures derived from Graham *et al.* (1960), referred to hereafter as Ability to Copy Forms. A scoring system for the last mentioned was specially devised for the Neonatal Jaundice Research (Smith and Phillips, 1972). The mothers of these subjects were interviewed and information was obtained for each child's developmental competence as measured by the Vineland Social Maturity Scale.

Instructions for the D-A-M test were: "Please make a drawing for me; draw me a man! Draw the best man you can make! Try and draw all of him!".

The 11-year-old sample

A second group consisted of 127 children, mean age of 11 yr at time of testing, in the range 10 yr 9 months–11 yr 3 months. The children, attending schools in the City of Birmingham, were selected by date of birth. The sample showed a slight over-representation of girls and a slight bias in favour of children of more highly skilled and socially privileged parents compared with local population statistics, but the size of the sample, type of school and position of child in family were as expected. Specifically, the sample did not exclude children from special schools and private schools and therefore in this respect it is representative of the general population of school children at this age. Standard tests of ability and educational attainment were individually administered and results of junior school leaving examinations were made available by the City's Education Department. A report on the Stanford–Binet, Form L-M results, which includes a detailed description of the sample characteristics, has been made by Phillips and Bannon (1968), and on the Bender Motor Gestalt Test by Broadhurst and Phillips (1969). Instructions for the D-A-M test were: "On this paper I want you to make a picture of a man. Make the very best picture that you can. Make the whole man. Take your time and work carefully". Any questions were replied to by: "Do whatever you think is best".

Scoring procedure

All the drawings from the two age-groups were scored by the three systems, Goodenough Points, Harris Points and Harris Quality Scales.

The evidence concerning interscorer reliability comes principally from the 11 year-old sample. Using the Goodenough test three judges independently assessed these drawings; they agreed on 78 per cent of the scorable items. In view of the high percentage of items on which there was not unanimity a fourth scorer was introduced, and the criterion of agreement between at least three out of four was adopted. A fifth scorer settled the still outstanding 9 per cent decisions, to arrive at the "true" score. Another three judges independently used the Harris Points Scale; and a fourth person made decisions on all items on which they were not unanimous and scrutinized the previous scoring. Three judges, different again, marked on the Harris Quality Scale; credit was given for scores on which at least two of the three agreed. A fourth person was introduced to make decisions on the rest, but 15 per cent of the drawings presented a problem in that four independent assessments resulted in four different marks and for these the average score was taken as the final "true" score. All those taking part were experienced educational psychologists, or students in training for that profession who had already had experience of these tests. Thus an exceptional degree of attention has been given to obtaining the "true" scores on these tests.

Scoring of the drawings of the 5-year-old sample was done routinely for Goodenough Points by the five psychologists taking part in the Neonatal Jaundice Research; for the other methods of scoring similar procedures were adopted to those used for the older children.

DETAILS OF THE SCORING SYSTEMS

The scoring of the drawings from these two samples and systematic examination of differences between scorers brought to light certain features of the scorers' behaviour, and some ambiguities in definitions of scoring items that necessitated local decisions.

Harris D-A-M Points Scale

Those who are familiar with the Goodenough Scale are cautioned not to carry subjects. Correlations between the three judges in this study range from 0·83 to 0·91. Analysis of variance between these judges yielded significant differences at the 1 per cent level.

Harris (1963) gives correlations between two independent judges of 0·97 for girls and 0·98 for boys, on the Points Scale for 75 children at 10 years, coefficients which are higher than those of other investigators. Yule *et al.* (1967) obtained correlations between three judges of 0·86–0·91 for a sample of 131 English children at 10 yr. Auricchio (1966) reports the value of 0·87. Sinha (1970), investigating a large sample of London schoolchildren aged 7–11 years, obtained an overall scorer-reliability of 0·81 between two judges, but for separate age groups correlations ranged from 0·65 to 0·88. The correlation coefficients from 0·89 to 0·91 in this study accord very well with other reports. Yule (1967) comments on the significant differences between judges in the absolute level of their scores as distinct from the product-moment order. In the present study also there is a significant difference (5 per cent level) between judges.

For the Quality Scale Harris reports interscorer reliabilities of 0·86–0·92 from drawings made by children at age 10 years. Our findings yield lower values, ranging from 0·73 to 0·77, from three judges and again there is a significant difference (1 per cent level) between these judges.

Interscorer reliability coefficients of these drawing assessments compare very favourably with most other brief single measures of intellectual maturity. Vernon (1960), commenting on Goodenough's scoring method, observes that "even trained scorers are apt to differ and this factor combined with the variability of the child's performance on different occasions means that the reliability of the test is rather unsatisfactory". The present investigation adds to the evidence that even experienced educational psychologists tend to have marked personal differences in the interpretation of drawings by all three methods of scoring, and that these differences are not reflected in reliability coefficients.

Sample performance

This means and standard deviations ("true" scores as described above) for the three scoring methods for the two age groups are given in Table 1. with the corresponding American norms for comparison. A raw score on Goodenough Points may be converted to a mental-age equivalent by a simple linear function; therefore the statistics for this test are given as raw scores. For Harris Points one needs both raw scores and standard scores in order to make comparisons between the author's norms and our results; both are given. Harris Quality scoring consists essentially of a 12-point scale; although Harris provides tables for the conversion of Quality scores to age based standard scores, Table 1 offers information on the former only, which are described as "raw scores".

The means reported by Goodenough and Harris for each age level apply to the mid-year of that age. Our 5-year-old sample has the right range for comparison and approximates to the desired mean age of 5½ years. The 11-year-olds, however, with a mean age of 11 yr 0 months, fall centrally between the 10 yr and 11 yr standardization groups; the results cited from Harris in Table 1 are averages of the means of his two age groups; the standard deviations are given for the two age levels separately.

TABLE 1. D-A-M: MEANS AND STANDARD DEVIATIONS AT 5 AND 11 YEARS

Method of scoring	5-year-olds				11-year-olds			
	This study		American norms		This study		American norms	
	m	*s.d.*	*m*	*s.d.*	*m*	*s.d.*	*m*	*s.d.*
Goodenough points:								
Raw scores	11·68	2·89	10·0		30·68	6·79	32·0	
Harris points:								
Raw scores	13·57	3·62	16·6	5·29	37·23	9·95	37·15	9·81 10·38
Standard scores	91·43	10·97	100·0	15·00	99·25	15·12	100·0	15·00
Harris quality	1·85	0·63	2·85	1·00	6·11	1·80	6·1	1·80 1·90

Goodenough Points Scale

At age 5 years this sample mean is higher than Goodenough's; she wrote that the given norms may be slightly too low at the lower end of the scale, but none of her standardization "normal" groups obtained a mean as high as ours. But it would be surprising if over a period of nearly half a century there had been no change in the average level of young children's abilities in this task. Moreover, there may be an influence from the earlier start of schooling for British children. At 11 years, our sample mean is lower than expected but Goodenough considered that her norms may be slightly too difficult at the upper end of the scale; her results were based on samples from a "normal" population whereas this study included retarded subjects. From this evidence the best estimate one can make is that for a mental age of 5½ years one demands a raw score of 12, not 10; and that a mental age of 11 years is associated with a raw score of 31 not 32. These would be, for most purposes, trivial adjustments, and in the main our results vindicate Florence Goodenough's developmental scale. In the clinical appraisal of individual children it is always important to know the "average" range of scores. If that range is defined as the convention of ± 1 *s.d.*, our results yield a range of about 8–15 points at 5½ years, and at 11 years a range of approximately 24–38 points.

Harris Points

At 5 years both the mean and the standard deviation of the raw scores on the Harris Points Scale are considerably lower than the values for Harris's standardization groups (mean 15·2, *s.d.* 5·01); they correspond fairly closely to his results for boys alone. Girls in the standardization sample scored significantly higher than boys on the average, whereas there was no difference between the sexes in this study. The relatively lower scores of this English sample are difficult to explain in view of the results from the Goodenough Points Scale, reported above. At 11 years our results and the American norms correspond closely; again no difference was found between the mean scores for boys and girls, whereas Harris reports a difference of three points in favour of girls. There is evidence that our 11-year-old sample may be slightly biased in favour of boys (Phillips and Bannon, 1968). In Sinha's recent study of London schoolchildren (1970) "mean scores . . . were higher than the norms for the corresponding groups in the American standardization, particularly for 7- and 8-year-olds", and she found girls superior on the average.

The conversion of raw scores to standard scores by the American norms appears to be a satisfactory psychometric step for 11-year-old English children. The 5-year-olds, however, present a problem apart from the fact that our mean is much lower and the range more restricted than the American standardization sample. The author has smoothed the means of the yearly age groups, the effect of which is to raise the means at the 5 year level, the youngest, by a greater margin than at any other. Consequently the disparity between the result for this study and the values on which the standard score norms are based, given in Table 1, is greater than the comparison already made. Using the American table for standard scores our mean is 91, as against the conventional 100. The performance of our sample of 5-year-old children on a number of other psychological tests (Phillips, 1968) makes it unlikely that our low mean score on the Harris Points scale at this age can be accounted for by relative inferiority of the sample. Until other evidence on English children's performance at 5 years is available it is probably better to avoid using the standard score.

Harris Quality Scale

Harris gives only extrapolated and smoothed means and standard deviations at age 5 years for his Quality Scale; these are considerably higher than the statistics from this study, as may be seen from Table 1. But at 11 years there is almost exact correspondence between our result and the interpolated mean and the standard deviations are comparable. We found no significant difference between the means for boys and girls at either age level.

Relationship between the methods of assessment

Product-moment correlation coefficients, based on raw scores, were calculated for the two age levels. The coefficients for the younger age group are weighted combinations, using Fisher's transformation, of the correlations obtained within the three sub-samples on which this study was based. The relationship between the Goodenough and the Harris Points scales, of about 0·9, seems to be very satisfactory for both age levels, and is about the median value of the inter-scorer reliabilities. Correlations between the Quality Scale and the other two methods are much higher for the 11- than for the 5-year-olds: Goodenough Points 0·83 and 0·62, Harris Points 0·86 and 0·56, respectively. Harris gives similar values to our 0·86 for his Points and Quality scales at 10 years (0·75) and at 12 years (0·84), but the correlation, 0·56, between the same tests at 5 years is much lower than his coefficient of 0·88 at 6 years. This evidence appears to be contrary to Harris's finding which led him to state that "up to the age of eight there is no difference between the scaling methods in the sensitivity of the test. By 9, the advantage of the Point scale method begins to appear and is appreciable by the age of ten".

Correlations were also calculated between the three methods and age. These are all insignificant and fail to support an expectation that within the age span 5:0–5:11 there would be evidence of development in the drawings.

Concurrent validity

Results of correlating D-A-M scores with other psychological tests are shown in Tables 2 and 3, for the two age groups. The coefficients at 11 years are generally higher than those at 5 years. As expected, the Harris Quality score yields somewhat lower correlations than the Points methods of scoring, but no studies have been traced which deal with the relationship between the Harris Quality Scale and other tests.

For the Harris Points Scale there are two major studies in this country. Yule *et al.* (1967), using 131 children from the Isle of Wight, average age 10·1 yr, correlated this measure with four subtests of the WISC, to obtain coefficients from 0·31 to 0·41. Sinha (1970) reports a wide range of correlations between the Harris Scale and a number of group measures of verbal and non-verbal ability. The correlations with Stanford–Binet in Tables 2 and 3 are similar to those reported from America (Vane, 1967); and from South Africa, Strümpfer and Mienie (1968) reported a correlation of 0·54 with an individual intelligence test among children of average age 11·4 yr.

Pringle and Pickup (1963), who gave the Goodenough test to 37 English school children each year from 7- to 10-years of age, obtained correlations with Stanford–Binet in the range 0·11–0·37. American studies reporting relationships between these measures (Estes *et al.*, 1961; Thompson and Finlay, 1963; Vane and Kessler, 1964; Muzerkari, 1967) have generally used samples with a narrower range of ability and a less restricted age range than the present study.

TABLE 2. PRODUCT-MOMENT CORRELATIONS: 5-YEAR-OLDS

	Harris Points	Harris Quality	Goodenough Points
Stanford–Binet	41	40	52
E P V T,1	28	17	21
Ability to copy forms	33	43	23
Vineland social maturity	−03	26	−07

Decimal points omitted. Values positive unless otherwise shown. From raw scores; these co-efficients are weighted combinations, using Fisher's z, of the values obtained from three sub-samples.

TABLE 3. PRODUCT-MOMENT CORRELATIONS: 11-YEAR-OLDS. (FROM RAW SCORES)

	Harris Points	Harris Quality	Goodenough Points
Stanford–Binet	49	41	56
E P V T, 2	47	42	43
Bender (Koppitz)	49	47	44

Decimal points omitted. All values are positive; the signs for the Bender test are reversed.

There is a statistically significant relationship ($p < 0{\cdot}01$) at 5 years and at 11 years between these tests and measures of general intellectual ability such as the Stanford–Binet scale, with much the same degree of association at the two ages. The Goodenough Points score shows a higher correlation than either of the Harris scores, a finding which agrees with that of Vane (1967) who reported correlations of 0·40–0·52 between Goodenough Points and the Stanford–Binet, and 0·34–0·42 between Harris Points and the Stanford–Binet. Assuming that the Stanford–Binet Scale is an adequate criterion measure of general intelligence, the implication of these findings is that the Goodenough scoring system remains the most valid of the three used.

But, of course, the correlations are low in relation to those generally found among measures of cognitive abilities and educational attainments. The relationship between children's drawings of the human figure and vocabulary growth is increased between age 5- and age 11-years but it is very slight at the younger age. Ability to Copy Forms and the Bender Gestalt Test (Koppitz) are tests of visuomotor and graphic development, appropriate to the two age groups, but it is uncertain to what extent they should be viewed as measures of the same psychological function. The Koppitz method of scoring the Bender drawings uses an error score, hence the negative signs expressing the inverse relationship with other scores are omitted from Table 3. It appears from our evidence that the relationship between this function and the drawing of a man tends to increase with age. Somewhat surprising is the evidence from Table 2 that there is no relationship in this population between Draw-a-Man and the development of personal competence assessed by the Vineland Social Maturity Scale.

In order to gain an insight into the cognitive function sampled in the D-A-M test, and into its relationship to tests of educational ability and achievement, a correlation matrix of nine variables (see Phillips and Bannon, 1968; Broadhurst and Phillips, 1969, for details) including the Harris Points D-A-M, derived from the sample of older children, was analysed by the Principal Components method and three factors were obtained by Varimax rotation. The correlation matrix is based on the raw scores with age partialled out; results are given in Table 4. The first Principal Component extracts nearly 70 per cent of the variance; it may be viewed as a "general" factor, within which the D-A-M and Bender tests obtain the smallest but significant loadings. The three Varimax factors employ 85 per cent of the total variance; use of this very high proportion is defended by the relatively high reliability of most of the test variables in the matrix. Verbal-educational abilities predominate in Factor I, on which the D-A-M test has a trivial loading. The test of psychomotor ability, the Bender, is largely separated in Factor III, which carries low loadings on the educational attainment tests and D-A-M, reflecting the minor ingredient of psychomotor organization which those tasks demand and which is not a component in EPVT and Progressive Matrices. The variable with the highest loading on Factor II is D-A-M. Interpretation of the cognitive dimension which this factor represents is obviously hazardous. It appears to be partly the familiar "spatial-perceptual-practical" factor, and partly a conceptual element that is not much reflected in academic performance. For children in the primary school stage at least, the drawing task is not primarily psychomotor, and the scoring in all systems is not mainly concerned with features of that kind. The evidence from this factor analysis supports that view of the task, and encourages one to doubt whether the aim of employing "children's drawings as measures of intellectual maturity" is well served by the increased weighting that Harris has in fact given to the motor co-ordination element.

TABLE 4. ELEVEN-YEAR-OLDS: LOADINGS OF 9 VARIABLES ON FIRST PRINCIPAL COMPONENT AND THREE VARIMAX FACTORS

	First principal component	Varimax factors I	II	III
Bender Motor–Gestalt	591	247	286	906
English	930	904	226	216
Graded word reading	877	884		232
Verbal reasoning	934	885	262	229
Mathematics	922	873	263	223
Stanford–Binet	921	843	393	
English picture vocabulary	838	743	477	
Progressive matrices	759	481	670	
Draw-a-Man	597		842	264
—Percentage variance	68·7	52·5	20·3	12·6

Decimal points omitted. All loadings are positive; the signs for the Bender test are reversed.

DISCUSSION

No psychological test is easier to administer and less expensive than the Draw-a-Man. By contrast, all methods of scoring children's drawings, including those examined in this report, demand as much detailed study and assiduous effort to achieve consistent interpretation as do more elaborate psychometric instruments. Although interscorer reliabilities can be satisfactorily high, our findings confirm that even with training and practice the scorer remains an important variable. With care, consistency can be achieved within samples, but comparisons between means of samples from independent studies seem to be of doubtful validity.

The present study provides evidence of the appropriateness of existing American norms at 11 years for both the Harris Points and the Harris Quality scales. Further evidence for English children at 5–6 years is needed before use of American norms can be confidently recommended because our sample obtained significantly lower scores than American standards although means from a number of other important cognitive tests were not lower than American norms.

Evidence on concurrent validity, from correlations and factor analysis, is of great interest. At both age levels there is a significant relationship between D-A-M scores and measures of general intellectual ability, and there is a suggestion that the traditional Goodenough Points scoring system may be the most valid of all those in current use. Among the younger children there appears to be no relationships between D-A-M scores and individual differences in social and personal competence. Psychomotor skills play only a small part in the maturity of children's drawings of a man through the primary school years at least. The importance of the D-A-M test at eleven years seems to lie in two related areas of cognitive growth: non-academic conceptual and "spatial-perceptual-practical"; but its contributions to the verbal-educational complex of abilities, within their normal range, is slight and there would seem to be no grounds for basing expectations of response to normal education upon performance in the D-A-M test.

Children's drawings are an indispensable source of evidence in psychological examination, especially as a means of gaining information about children whose intellectual maturity cannot reasonably be assessed by verbal tests. When a child's drawings provide evidence of a level of functioning which is markedly discrepant from results of measures that for him are culturally biased, or from performance on tasks which involve psychological processes in which he is possibly handicapped, such evidence is invariably important. Individual psychological examination often requires one to evaluate drawings in terms of typical stages of conceptual development as these are reflected in children's graphic representations of the human figure; but these stages do not constitute a single linear process. Age-peer norms are possibly less valuable in this context than the "mental age" approach which Burt offered fifty years ago; and the methods of scoring employed in this study may not serve very well the differential diagnosis of children with learning and adjustment problems; it must be admitted that they do not claim to do so. Reservations over the use of the D-A-M test in a clinical setting are needed, particularly over scoring by a single individual, but it can contribute to the assessment of children for whom other and more reliable measures are not applicable.

SUMMARY

The performance of samples of English children at five and eleven years on the Draw-a-Man test is assessed by the scoring methods of Goodenough and Harris. Proposals are made for improving definitions of some scoring instructions. Inter-scorer reliabilities are reported. Average scores of the samples are compared to American norms. Relationships between scores on this test and other cognitive and educational tests are interpreted.

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ANDROGEN-INDUCED SOCIAL DOMINANCE IN INFANT FEMALE RHESUS MONKEYS

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INTRODUCTION

THE SEXUALLY dimorphic character of social behavior in rhesus monkeys becomes clear early in the first year of life. Males surpass females in frequency of several forms of social play and masculine sexual behavior. They are tougher than females and attain higher positions in the hierarchy of social dominance (Rosenblum, 1961; Harlow *et al.*, 1966). Within the past decade, these dimorphisms have been shown to be produced largely, if not entirely, by the amount of male hormone present during fetal development. The fetal testis is active in androgen secretion whereas the fetal ovary is relatively quiescent (Resko, 1970). If the fetal female monkey is given exogenous testosterone propionate via the pregnant mother, its behavioral development progresses along masculine lines (Goy, 1968). These findings are not without significance for human development. For example, the female offspring of women who during pregnancy received steroids with androgenic side effects (to prevent miscarriage) were found to be unusually assertive and to prefer masculine activities, although there were no signs of homosexuality (Ehrhardt and Money, 1967).

In monkeys, two lines of evidence suggest that the critical period for permanent behavioral masculinization by androgen is during prenatal development. First, male rhesus monkeys castrated at birth or at three months of age continue to show masculine behavioral development despite the absence of testicular androgens (Goy, 1968). Second, in male rhesus monkeys plasma testosterone levels drop soon after birth and remain very low until the onset of puberty at about three years of age (Resko, 1967). Nevertheless, no one had shown directly how the post-natal administration of androgen affects behavioral development in young female rhesus monkeys.

METHOD

Subjects and treatment

Three female and three male rhesus monkeys born within a 53-day period in the laboratory to wild-captured females were separated from them at 3–4 months of age. The female subjects were injected intramuscularly with 2 mg testosterone propionate per kg body weight in propylene glycol every Monday, Wednesday and Friday. Injections began when the subjects' mean age was 6·5 months and ended when they were 14.5-months-old. The males were untreated.

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Observations of social behavior

Between the ages of 5–9·5 months, the animals were put together in an observation room for 30 min daily, 5 days per week. This test period, called the "first run", was followed by a second run which began when the subjects were 13·5-months-old and ended when they were 16-months-old. A third run, identical with the second, was conducted when the subjects were 25–27·5-months-old. Except when being tested, the monkeys lived in individual cages.

The observation room for the first run measured 2·0 m high, 2·0 m long, and 1·3 m wide; the room used for the second and third runs was 2·0 m high, 2·9 m long, and 1·8 m wide. Both rooms were equipped with a horizontal stainless steel mesh platform joined to the floor by a similar inclined platform. One wall of both rooms was made of Plexiglas.

During the 30-min observation sessions, the absolute frequency of the sexual, aggressive, and fearful behavior of each monkey was recorded by two experienced observers. The frequency of playful behavior, however, was recorded for each animal for only 5 min per session. The order in which the 6 animals were scored for playful behavior was rotated daily. Since many of the behaviors recorded were either redundant or irrelevant to the main findings of the study, only the behaviors to be discussed will be defined:

(i) *Mounts with pelvic thrusts.* The subject thrusts back and forth with the pelvis against any part of the recipient's body. Thrusting occurs in a crouched or standing position with feet on the floor or one or both feet clasping the ankles of the recipient.

(ii) *Aggression.* Biting with vigorous head shaking, as if to tear flesh. Aggression is usually accompanied by piloerection and vocalization.

(iii) *Fear grimace.* A facial expression in which the lips are retracted to expose the teeth with the mouth slightly open.

(iv) *Rough-and-tumble play.* Vigorous wrestling, biting, and tugging at the fur with shifting position of the mouth.

(v) *Gentle play.* Wrestling, biting, and tugging at the fur, but with less vigorous body movement than in rough-and-tumble play and with more gentle oral contact.

(vi) *Play initiation.* A vigorous sham biting usually preceded by a lunge. Playful biting often initiates play.

(vii) *Social threat.* A sterotyped facial expression in which the mandible is dropped abruptly, the mouth remains wide open, but the teeth are not extensively exposed or fully bared. This gesture, which often serves to initiate play or chasing, was not recorded if it occurred during rough-and-tumble or gentle play.

Determination of social dominance during group interaction

The social dominance hierarchy was determined by fear grimaces while the group was interacting in the observation rooms. In a stable dominance hierarchy, the most subordinate animal fear grimaces to all other animals; the next animal fear grimaces to all but the bottom animal, and so on; the most dominant animal fear grimaces to no other animal. If an animal regularly elicits fear grimaces from a second animal, he can successfully attack the second, which will retreat before any hostile gesture by the first. No attempt was made to determine whether aggressive acts elicited fear grimaces or vice versa, but the causal relationship probably operates both ways. Fear grimaces correlate not only with the direction of aggressive encounters but also with other behaviors. An animal that does not fear grimace to a second animal moves more freely about the observation room, is more likely to gain access to a limited supply of food or water, and seldom retreats from the second animal. Occasionally the dominance relationship between two monkeys is unclear since neither fear grimaces to the other.

Water-competition dominance tests

After the third run, when the animals were 28-months-old, they were tested in pairs for social dominance by a technique similar to that devised by Alexander and Harlow (1965): subjects were deprived of water for 24 hr and then each pair was given a single water bottle. The animal that took the least time to gain access to the water bottle for a total of 30 sec was judged the dominant member of the pair. In all but one of the 27 tests, the results were unequivocal: dominant animals achieved the criterion in a mean time of 38 sec while subordinate animals required a mean of 151 sec.

Each of the three androgen-treated females was matched in the water-competition tests against each of 9 other monkeys, none of which had received hormone treatment: (1) the 3 males from their own group, (2) 3 males from another group, 1 of which had been castrated at birth, and (3) 3 females from other groups. The groups from which these subjects were taken had been raised and tested in the same way as the group described in the present study. The 3 males and 3 females from other groups were strangers to the androgen-treated females and were matched with them for age and body weight.

RESULTS

During the 8 weeks of social interaction, before the onset of androgen treatment, the males occupied the top positions in the social hierarchy (Fig. 1) and showed more aggression than the females. The mean frequency of aggressive encounters per 2-week block during this time was $1{\cdot}25 \pm 0{\cdot}75$ for the males and $0{\cdot}08 \pm 0{\cdot}08$ for the females (Mann–Whitney $U = 0$; $p = 0{\cdot}05$, one-tailed). After the pre-treatment period, differences between the males and females in the frequency of aggression were not statistically significant. Changes in the frequency of aggression, however, will be described to facilitate an understanding of the changes in social dominance.

During the latter part of the first run, when the females were receiving androgen, the frequency of aggression by males and females was about equal, but the males maintained a tenuous hold on their dominant status. At the beginning of the second run, when the females were still receiving androgen, 2 of the females attacked and subdued the 2 most dominant males. Although testosterone treatment ended after the first 4 weeks of the second run, these 2 females continued throughout the remaining 6 weeks of the run to be more aggressive than the males and to dominate them. During the third run, conducted 10·5–13 months after the last hormone injection, the social hierarchy was quite stable: the females still occupied two of the three top positions (Fig. 1) and aggression occurred only infrequently. The

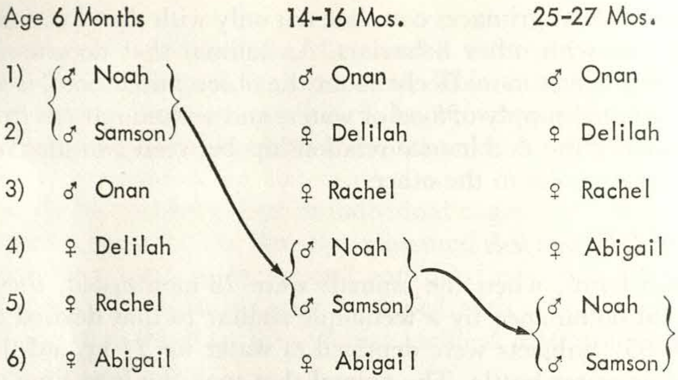

FIG. 1. Rankings of social dominance based on fear grimaces. The first ranking was made during the second month of the first run, after dominance relationships had stabilized but before the onset of androgen treatment. The second determination was made during the second run, which included the 4 weeks before and first 6 weeks after the end of hormone treatment. The last ranking was made during the third run, conducted 10·5–13 months after the last hormone injection. Monkeys joined by brackets were indistinguishable in social status in that neither fear grimaced to the other.

stability of the social hierarchy during the third run and the decreased level of hostile behavior was accompanied by an increased frequency of social play among both the male and female members of the group. The females, however, continued to intimidate the males to the extent that the males rarely engaged in rough-and-tumble play or masculine sexual behavior such as mounting and pelvic thrusting.

An exception to the feminine usurpation of dominance was a male, originally third in rank, which became the top monkey of the group and increased his frequency of aggression. For this reason, the increased mean frequency of female over male aggression during hormone treatment was not statistically significant. This male's enhanced status depended on the support of the second-ranking monkey, a female. When this female was removed from the group, the otherwise "dominant" male screeched, fear grimaced, withdrew from social contact and was often attacked and beaten by the other monkeys. During the third run, however, this male was able to retain his dominance status as long as he had the support of the second-ranking female at the beginning of a test session or as long as he could see or hear her.

During the first run, the males greatly surpassed the females in frequencies of sexually dimorphic behaviors which typically occur more often in males. This was, of course, expected. The frequencies per two-week block of these behaviors and their standard errors for males and females respectively were as follows: rough-and-tumble play, 5·2 ± 0·9 vs. 0·1 ± 0·1; gentle play, 3·7 ± 0·6 vs. 0·9 ± 0·1; play initiation, 21·4 ± 3·7 vs. 1·4 ± 0·5; social threat, 13·2 ± 2·8 vs. 0·3 ± 0·2; and mounts with pelvic thrusting, 4·2 ± 0·4 vs. 0·2 ± 0·1. These differences were statistically reliable (all *p*'s < 0·01; *d.f.* = 4; two-tailed *t*-tests). During the second run, however, after the shift in dominance relationships, the males as well as the females showed almost none of these behaviors, apparently because the males were simply too frightened by the females to engage in such activities. Figure 2 shows

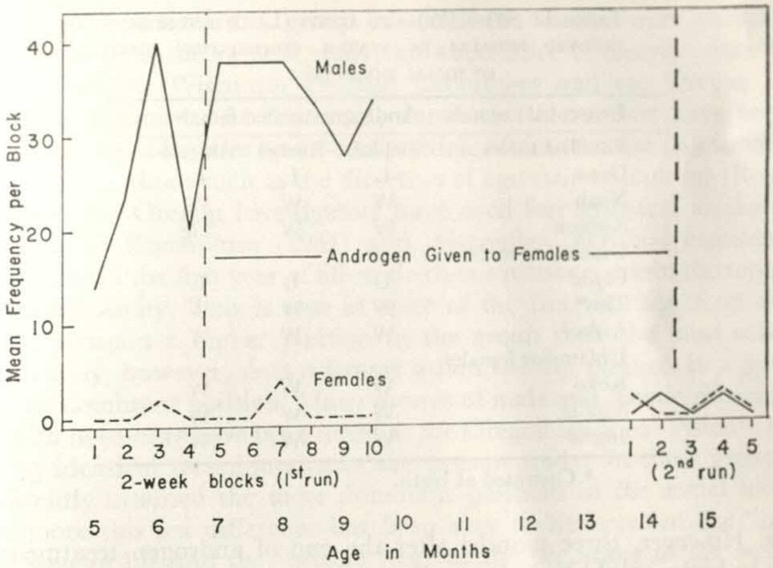

FIG. 2. Frequency of rough-and-tumble play by males and females. Each point on the graph represents the total absolute frequency for ten 30-min test sessions (2-week blocks), averaged for each sex.

these changes for rough-and-tumble play, which closely resemble those for the other behaviors mentioned above. When the frequencies of these behaviors by males and females during the first and second runs were subjected to 2 × 2 analyses of variance, the sex *X* runs interactions were significant beyond the $p < 0\cdot01$ level for each behavior except gentle play, which was significant at the $p < 0\cdot025$ level.

Androgen treatment did not increase the females' frequencies of playful behaviors nor masculine sexual responses. The frequencies of these behaviors by the three androgen-treated females were compared with those by 18 untreated females tested in the same way at the Oregon Regional Primate Research Center. The mean frequency of none of these behaviors was significantly greater than that by the untreated control females (one-tailed *t*-tests; 5 per cent level of significance).

Androgen induced several physical changes in the female subjects. Their facial appearance, together with a precociously rich coat of hair, reddened sex skin, and stocky body build gave them the general appearance of older, more mature females. Within 6 months to 1 year after hormone treatment had ended, however, these changes in appearance were much less apparent. Clitoral hypertrophy induced by androgen treatment, however, persisted as a permanent anatomical change. During the period of hormone treatment, the mean gain in body weight by the three treated females was 1·8 kg ± 0·2 as compared to only 1·0 kg ± 0·1 for the males ($t = 3\cdot61$; *d.f.* = 4; $p < 0\cdot01$, two-tailed). The weight gained by the treated females was also greater ($t = 4\cdot26$; *d.f.* = 6; $p < 0\cdot05$, two-tailed; unequal variances) than that gained by 5 untreated females the same age (0·9 kg ± 0·04). At the end of androgen treatment, the females had a mean 28 per cent weight advantage over

TABLE 1. WINS (W) AND LOSSES (L) OF ANDROGEN-TREATED FEMALES IN WATER COMPETITION TESTS OF SOCIAL DOMINANCE

Untreated animals	Androgen-treated females		
Familiar males	Delilah	Rachel	Abigail
Onan	L	L	L
Noah	W	W	W
Samson	W	W	Tie
Unfamiliar males			
Clyde	L	L	L
Tim*	W	W	W
Arthur	W	W	W
Unfamiliar females			
Koko	W	W	W
Sophia	W	W	W
Ingrid	W	W	W

* Castrated at birth.

the males. However, three months after the end of androgen treatment, the sex difference in body weight had almost disappeared and after 5 months it had totally disappeared.

The results of the water-competition tests for social dominance are shown in Table 1. Thirteen months after their last hormone injection the androgen-treated females were clearly dominant over untreated females, and "held their own" with both familiar and unfamiliar males. Each of the three androgenized females ranked ahead of the three untreated females, and this difference in rank was statistically significant (Mann–Whitney $U = 0$; $p = 0{\cdot}05$; one-tailed).

DISCUSSION

The infrequency of masculine patterns of playful and sexual behavior by the females both during and after hormone treatment demonstrated that, unlike prenatal androgen treatment, androgen injected during infancy does not masculinize patterns of playful and sexual behavior. In rhesus monkeys the masculinizing role of androgen on the neural tissues mediating playful and sexual behavior is probably limited to prenatal development. The results of the present study, however, do not preclude the possibility that this critical period could extend into early postnatal life, since no androgen was administered until the subjects were 6·5-months-old.

Androgen injected into intact infant female rhesus monkeys between 6·5 and 14·5 months of age increased their social dominance. Androgen administered to adult ovariectomized female rhesus monkeys for 2 to 3 weeks made them socially dominant over adult males, as measured by the relative frequency of threat gestures (Trimble and Herbert, 1968); adult ovariectomized female chimpanzees treated with androgen for a similar period of time became temporarily dominant over other females, measured by competition for food (Birch and Clark, 1946). The results of the present study demonstrate that the infant female rhesus monkey as well as the adult, is sensitive to the effects of the male hormone on socially dominant behavior.

Although no formal control group in which the females were untreated with androgen was used in the present study, an abundance of baseline data has been obtained both at the Wisconsin Primate Laboratory and the Oregon Regional Primate Research Center. At Wisconsin, dominance hierarchies have been determined by either the Alexander water-competition dominance test (Alexander, 1965) or by less formal methods such as the direction of agonistic encounters (Rosenblum, 1971), whereas the Oregon investigators have used fear grimaces as the index of social dominance. Rosenblum (1961) and Alexander (personal communication, 1964) report that in the first year of life male rhesus monkeys attain the top positions in the social hierarchy. This is true in spite of the fact that the most dominant female often occupies a higher position in the group than the most subordinate male. Very rarely, however, does a female attain the top position in a group or a male the least dominant position. Many groups of male and female rhesus monkeys untreated with hormones have been tested at the Oregon Regional Primate Research Center using identical techniques as in the present study. In these groups, males have consistently attained the more dominant positions in the social hierarchies, and furthermore this sex difference has been very stable between the "first run" in the first year of life and the "second run" at the beginning of the second year (Goy and Phoenix, personal communication, 1971). Therefore, the shifts in male-female dominance relationships observed in the present study cannot be reasonably attributed to either the lack of a clear-cut sex difference or to its instability between test runs.

It is unclear whether the increased social dominance in the infant female monkeys was caused by the effects of androgen on the central nervous system, peripheral structures, or both. The increased body weight and muscle mass induced by the hormone may have helped the females to achieve and consolidate their enhanced dominance status, but it is doubtful that they were the only forces involved. Within 1 month after the onset of testosterone treatment and before the females surpassed the males in body weight, 2 of the females had greatly increased their frequency of aggression, and this behavior later proved instrumental in achieving social dominance over the males. The third female, which gained the most weight and at the end of hormone treatment was the heaviest, remained the most subordinate in the group; not until she had lost her weight advantage at the age of 25 months did she advance to fourth place in the hierarchy (Fig. 1).

The results of the water-competition dominance tests, given 13 months after the last androgen injection, strongly suggest that the increased social dominance in the androgenized females was long lasting, if not permanent. According to a different method of measuring dominance, these tests also confirmed the dominance relationships between the androgenized females and the males from their own group. Fear grimaces occurred in 11 of the 27 water-competition tests and were always shown by the losing animal. The results of these tests also help to refute the hypothesis that feminine social dominance persisted only because the social upheaval produced by the females during androgen treatment had so intimidated the males that they were incapable of regaining their original positions in the hierarchy. Experiments on mice with a history of defeat in aggressive encounters have suggested that such an effect can be mediated by increased adrenal response (Bronson and Eleftheriou, 1965). After the end of hormone treatment, such a mechanism could have contributed to the continuation of the androgenized females' dominance over 2 of the 3 males from their own group but not to their dominance over 2 of the 3 unfamiliar males or the 3 unfamiliar females.

The fact that one of the unfamiliar males was castrated at birth should not have affected his behavior in the water-competition tests since the behavior of neonatally castrated males during pre-adolescent development has not been shown to differ from that of intact males (Goy, 1968). The castrated male was socially dominant over 1 of the 2 intact males and all 3 of the females in his own group.

Androgen appears to have induced a permanent or long-lasting increase in socially dominant behavior, but the reasons for the permanence of this behavioral change are unclear. One possibility is that within the neural tissues that control the expression of socially dominant behavior androgen caused a permanent change similar to the changes presumably wrought by prenatally injected androgen in the neural structures that mediate playful and sexual behavior. If this were the case, the critical period during which androgen can masculinize dominance-related behavior would have to extend into the second half of the first year of postnatal life, and thus to include a later period in development than the critical period for the masculinization of sexual and playful behavior.

A second or additional way in which androgen could have produced long-lasting changes in behavior is indirectly through learning. Since the hormone was injected for a considerable period of time, the females had ample opportunity to practice socially dominant behavior and to experience its rewards. By the end of hormone treatment, this behavior could have been so well learned that it became independent of hormonal support. The opportunity to practice socially dominant behavior during infancy has been shown to greatly facilitate the attainment and maintenance of social dominance in wild Japanese macaque monkeys. Koyama (1967) found that dominance relationships among infant monkeys of the same age and sex, which are formed according to the rank of their mothers, tend to persist and become stable as the animals mature. These rankings, which were originally dependent on the mothers' status, persisted even after the mothers' backing was withdrawn in much the same way that the enhanced status of the females in the present study persisted after hormonal stimulation was withdrawn.

An analogous relationship between the practicing of a behavior during hormonal stimulation and its persistence after hormone withdrawal can be seen in prepuberally castrated male cats injected with androgen as adults. Cats given the opportunity to mate during androgen treatment continued to mate for several weeks after hormone withdrawal, whereas animals given identical hormone treatment but denied the opportunity to mate failed to show mating responses (Rosenblatt and Aronson, 1958). Since dominance-related behavior in monkeys is probably less dependent on hormones and more dependent on learning than sexual behavior in cats, it would not be surprising if the enhanced dominance status in the female monkeys had become totally independent of exogenous androgen support.

The importance of learning in human development would suggest that any major behavioral change caused by an altered physiological state lasting several months or years during childhood and which leads to positive reinforcement from sources independent of the physiological state itself could persist after the physiological agents originally responsible for the change had disappeared.

SUMMARY

Androgen injected into infant female rhesus monkeys between 6·5 and 14·5 months of age increased their aggressive behavior so that they replaced males in the top positions of the social hierarchy. Since this behavior has persisted for a year after the last hormone injection, the male hormone may have directly induced a permanent change in the nervous system; a more plausible explanation, however, is that socially dominant behavior was so well learned during hormone treatment that it became independent of hormonal support. Despite the increased aggressiveness of the females, their playful and sexual behavior has remained feminine.

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A NOTE ON A FOLLOW-UP STUDY OF CHILDHOOD NEUROSIS AND BEHAVIOUR DISORDER

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INTRODUCTION

THE FIRST child psychiatric unit in Hong Kong came into existence with the opening of the Yaumatei Psychiatric Centre in March 1967. It is run part-time—two mornings a week. The main sources of referrals are from general practitioners, paediatricians and the Government's special education section. Children may be seen as private fee-paying cases or as public cases. Private patients pay a fee of H.K.$25.00 while public patients pay $1.00 per visit. Since this unit, albeit a very small one, has been functioning for over 4 years, we would like to assess our treatment results by means of follow-up studies. This study is on two common childhood conditions, one with neurotic symptoms and the other with behaviour disorder. Neurotic symptoms include anxiety, depression, phobias, obsessional, hysterical and psysomatic symptoms, irritability and tension manipulations in the absence of psychotic or organic features. Behaviour disorder refers to manifest behaviour disturbances of children at home, in school or in the community, which are not the result of organic brain damage or psychosis. The common behaviour disturbances are hostile disobedience, destructiveness, aggressiveness, truancy, lying, stealing and running away from home.

MATERIAL AND METHODS

Case-notes of children registered with the Yaumatei Psychiatric Centre from June 1967 to June 1971 were scrutinized and those bearing the diagnosis of a neurosis or behaviour disorder, as defined and seen by the author at least a few times during the course of treatment, were studied. There were 42 neurotic children (2 private and 40 public cases) and 30 children with behaviour disorder (2 private and 28 public cases) giving a total of 72 children for follow-up. Twenty of these children (8 neurotic and 12 with behaviour disorder) were still attending the Centre. For the 52 who were not currently attending their parents were asked by telephone or by post to come with them for assessment. All except 4 of them attended. In the latter cases a home visit was made by a psychiatric social worker. One of these died of heart disease and it was reported that before his death there was no improvement in his disturbed behaviour. The other 3 had moved away and for these the period between their first and last attendances was counted as the length of follow-up.

The condition of the children at follow-up was assessed by the author. In the assessment two aspects or dimensions were considered to be the most important.

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These were:

(i) their neurotic or antisocial symptoms irrespective of whether or not these were the same as those at their initial attendance, and

(ii) their relationship with others especially members of their family. These two dimensions were rated from 0 to 4 as shown in Tables 1 and 2. The scores obtained by a child on both dimensions were then combined to give the total score. Thus, for each child there was a total score before treatment and another at follow-up. The change in score, i.e. the difference between the child's initial and final total scores could be used as an indicator of improvement. According to this change in score the children were assigned into 3 categories of improvement:

(i) "fully recovered" when the total score at follow-up was 0 (i.e. symptom-free and well-adjusted),

(ii) "significantly improved" when the total score showed a decrease of 4 or more at follow-up, and

(iii) "not significantly improved" when the decrease in score was less than 4.

TABLE 1.

Score	Severity of neurotic or antisocial symptoms
0	Absent
1	Mild
2	Moderate
3	Marked
4	Severe

TABLE 2.

Score	Relationship with others
0	Well-adjusted
1	Satisfactory
2	Fairly satisfactory
3	Not satisfactory
4	Poorly adjusted

RESULTS

In the neurotic group there were 28 (66·7 per cent) boys and 14 (33·3 per cent) girls. Four of the neurotic children were in the age range of 5 to 7 yr, 19 from 8 to 10 yr, and 19 from 11 to 13 yr. The average duration of illness before attending was 11 months and the mean follow-up period was 2·7 yr ranging from 1 to 4 yr. Of the children with behaviour disorder there was 19 (63·3 per cent) boys and 11 (36·7 per cent) girls. Two were in the age range of 5–7 yr, 14 were from 8 to 10 yr and 14 from 11 to 13 yr. The average duration of illness before attending was 1·6 yr and the mean follow-up period was 2·9 yr ranging again from 1 to 4 yr.

TABLE 3.

Improvement	Neurotic group	Behaviour disorder group
"Fully recovered"*	15	2
"Significantly improved"*	18	14
"Not significantly improved"	9	14
Total	42	30

* These 2 categories are combined for calculating χ^2.

Table 3 shows the outcome of the 2 groups of children at follow-up using the criteria of assessing the improvement described earlier. It is seen that 33 (78·6 per cent) of the neurotic children and 16 (53·3 per cent) of the children with behaviour disorder were "fully recovered" or "significantly improved" at follow-up. Since the mean follow-up periods were about the same, the neurotic group has given a significantly better outcome. (χ^2 with Yates' correction $= 4{\cdot}03, p < 0{\cdot}05$).

Two factors have been found to influence the prognosis:

(i) *Sex.* Of the 9 neurotic children who were "not significantly improved" at follow-up there were 3 boys and 6 girls. In other words 25 of the 28 boys but only 8 of the 14 girls were "fully recovered" or "significantly improved" at follow-up. This difference is statistically significant (χ^2 with Yates' correction $= 3{\cdot}98, p < 0{\cdot}05$). Such a difference does not exist in the group with behaviour disorder.

(ii) *Duration of illness.* The average duration of illness of the neurotic children before attending was 11 months. Of the 14 children with duration of illness more than 11 months, only 7 were "fully recovered" or "significantly improved" at follow-up but of the 28 children with duration of illness less than 11 months 26 belonged to these 2 categories, The difference between these 2 sub-groups with regard to outcome is statistically significant (χ^2 with Yates' correction $= 7{\cdot}8$, $p < 0{\cdot}01$).

Similarly, in the group with behaviour disorder, 15 had duration of illness longer than the mean period of 1·6 yr and 15 less than this mean period. Only 5 of the former sub-group as compared with 12 of the latter were "fully recovered" or "significantly improved". This difference is also statistically significant (χ^2 with Yates' correction $= 4{\cdot}89, p < 0{\cdot}05$).

DISCUSSION

Neurotic children have been found to have a better outcome than children with behaviour disorder. There may be various reasons for this. Antisocial behaviour would arouse antipathy of the parents and siblings and enhance parental rejection, which may have been the cause of the child's disturbed behaviour. Secondly, as compared with the neurotic group, the behaviour disorder group has a longer onset-attending duration and the duration of illness has been found to influence the prognosis. Thirdly, in the treatment of childhood neurosis, anxiolytic and antidepressant drugs are used and these have been found effective by workers like Frommer (1967) and Kelly *et al.* (1970). It is difficult, however, to explain why boys should improve quicker than girls. Probably the latter were under greater stress and strain, for example some girls had to do domestic work and look after their younger siblings besides their school sessions.

How do our treatment results compare with those in Western countries? One difficulty of making comparisons is that in most other studies different diagnostic categories were lumped together. Perhaps two studies consisting of samples more comparable to the present one may be cited. Rexford *et al.* (1956) followed up children treated for antisocial disorder during 1947–1952. She found that psychiatric treatment was effective in at least 32 (i.e. two-thirds) of the 48 cases they were able to contact. However, many of these children were still deficient in their social relationships, performed below their intellectual capacity in school and showed little interest in constructive recreational activities. Based on our criteria, treatment was effective in 53 per cent of our children. With regard to child neurosis, Robins and O'Neal (1953) followed up 41 hospitalized children diagnosed hysteria, hypochondriasis and mixed psychoneurosis. Thirty-seven of these children were located and 23 were personally examined. Of these 23, with a follow-up period ranging from 2 to 17 yr, 7 were described as suffering from severe disability, 9 from mild disability and 7 free from any disability. The present finding that over 78 per cent of the neurotic children were symptom-free or significantly improved at the end of the follow-up period is encouraging.

SUMMARY

Forty-two neurotic children and thirty children with behaviour disorder were followed up from 1 to 4 years after they attended for psychiatric advice. The mean follow-up period for the former group was 2·7 years and for latter 2·9 years. At follow-up 78·6 per cent of the neurotic children but only 53·3 per cent of the group with behaviour disorder were symptom-free or significantly improved.

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BOOK REVIEWS

G. Stanley Hall: The Psychologist as Prophet. DOROTHY ROSS. The University of Chicago Press, Chicago and London, 1972, pp. xx + 482. $12.75.

THIS IMPORTANT study of G. Stanley Hall goes far both to rehabilitate Hall in the pantheon of American Psychology, and to explain his almost total neglect by most of his fellow-countrymen today. Roback did indeed pay due credit to him in his *History of American Psychology*, but Hall gets not a mention in books such as Woodworth and Sheehan's *Contemporary Schools*, or in George Miller's *Psychology*. Yet Stanley Hall was in many ways *the* pioneer American psychologist with, as Roback put it, "a record of firsts". He was the first American student to work in Wundt's laboratory; he was the founder both of the first psychological laboratory in U.S.A. at Johns Hopkins in 1883, and of the first American psychological journal, the *American Journal of Psychology*, which he edited from 1886 to 1920. He was the first President of the American Psychological Association and the prime mover in its foundation. He was the first President of Clark University, where he established a large post-graduate school. He was a pioneer of American child study, and wrote the first comprehensive book on the psychology of adolescence. Later in his life he wrote the first psychological treatise on ageing (*Senescence: the Last Half of Life*, 1922); and finally, and for this he has been remembered, when all else has been forgotten, he first introduced Freud and psychoanalysis to America.

In spite of this remarkable record Stanley Hall was in a very real sense a failure, and Mrs. Ross, in her admirable book, helps to explain why. Hall blazed the way, but he could not consolidate. He was a man of contradictions and indecisiveness, poor in his personal relations, uncritical in his methods and his enthusiasms, and possessing a strangely tangled personality. Four years after the establishment of Clark University his devious ways had led to two-thirds of his faculty and seventy per cent of his student body leaving, and to serious disagreements with his founder-benefactor. He made many enemies, and had few close friends. His eloquence and his drive continued to win him a popular following but not the steady backing and respect of his professional colleagues. His books are an odd mixture of brilliant insights and deplorable gush.

Hall's most lasting achievement was in the area of developmental, or genetic, psychology. Though he never developed his views rigorously and systematically, the theory of evolution, which he had imbibed during his early manhood, was the keystone of his approach. Mrs. Ross sees him as a prophet, rather than a scientist in the strictest sense. He was an enthusiastic advocate of the psychological approach to the understanding of child development, and in the 1880s a leader in the child study movement. He collected vast masses of data, relying largely on questionnaires, about every aspect of childhood, children's fears, lies, motor and sensory development, and above all sexual maturation, a topic about which he became more and more obsessed. Unfortunately a great deal of the data was scientifically shoddy, poorly analysed, and uncritically interpreted. In spite of this Hall did succeed in putting child psychology on the educational map, and more scientific investigators, including some of his own pupils, like Arnold Gesell, tightened up the methodology. His own major work, *Adolescence* (1904), however, notwithstanding its shortcomings, can rightly be regarded as a classic. It was, as the biologist Patrick Geddes observed both "profound and original".

Of all Hall's achievements the Clark conference on psychoanalysis, which he organised in 1909, has perhaps made the greatest impact on the history of psychology. The famous photograph of the participants, which Mrs. Ross includes as one of the too-few illustrations in her book, is a gallery of psychological notables, Freud, Jung, William James, Ernest Jones, Ferenczi, Titchener, William Stern, Adolf Meyer, and many others. Freud's lectures, published in Hall's journal, the *A.J.P.*, brought psychoanalysis to the attention of American psychologists, and made a profound and lasting impression in America.

Mrs. Ross's splendid study of Hall is a work of the highest scholarship. She has combed the extensive source material, and has left no stone unturned to explore the contemporary background of Hall's work, and its relation to the educational and scientific developments of its day. She has written an eminently readable, interesting and informative book, which is certain to be the standard life of Hall, and which illumines both his curiously tortuous personality, and the story of his mixed achievements and failures.

L. S. HEARNSHAW

Der Fruhkindliche Autismus unter dem Aspekt der Enwickelung. DORIS WEBER. Hans Huber, Bern, 1970, pp. xxii + 117. D.M.19.

THIS MONOGRAPH gives an extensive account of a group of 81 autistic children and young adults. They had been diagnosed in the child psychiatric and school medical service of the University of Marburg.

The object of the study was to demonstrate the developmental aspect of autistic symptoms. The group was divided into three sub-groups. The first sub-group of 9 children were diagnosed as "autistic psychopaths", a condition first described by Asperger (1944) within months of Kanner's paper on autistic disorders (1943). The second sub-group of 66 children who were suffering from the Kanner type of early infantile autism are studied more extensively. The third sub-group of 6 children were regarded as a special group.

Asperger's paper reported on a group who were not so severely ill as Kanner's autistic group. They had speech and some of them were able to hold down professional posts when they grew up. The author points out with some justification that Asperger's work has been largely ignored in the English literature on the subject of autism.

There were three criteria for the selection of the early infantile autism group, namely: an extreme degree of isolation since infancy, with use of persons as things or objects, insistence on preservation of sameness in the environment through years, and abnormalities of speech development, which included absence of speech. In 41 cases the child's abnormality had shown in the first year of life, and in all by the third birthday, no less than 41 per cent had sustained brain-damage. Ninety-seven per cent had been thought to be partially or totally deaf at some stage, all in this group showed motor deficiencies, and five had fits.

Eleven of the 66 children were studied more closely to establish how their symptoms developed and changed over the course of years. Of 37 behavioural symptoms most showed improvement, however there were some interesting exceptions. As they grew older the children's compulsiveness tended to increase, and they showed a lack of reticence towards others. The previous marked restlessness of many had given place to relative inertia, and there was a decrease in paroxysms of anxiety. There was some periodic variation in symptoms.

The rest of this account is devoted to a consideration of the significance and developmental aspects of sensori-motor aberrations in the behaviour of autistic children. This part of the study is fascinating, and regrettably brief. A comparison is drawn of the eye-fingering and stimulation carried out by many blind and partially sighted children, with those seen in younger autistic children. The author postulates that the autistic child has a central sensory defect with regard to recognition of the human face, which may explain the similarity of behaviour to that of blind children, and the failure to react appropriately to the sight of the mother's or father's face in early infancy. Such a failure to respond, either by absence of eye-contact, or by total passivity, or lack of smiling response had been noted in the first year of life in 70 per cent of this group.

Clumsiness and odd motor symptoms such as toe-walking, standing on their head, lack of self-preservation, e.g. when immersed in water, are attributed to immaturity or delay in development of the central nervous system, and the word "apraxia" is used, with the qualification that it is inappropriate, as skill has not been lost but never acquired. These symptoms also gradually become modified during the course of variously delayed development.

The author seemed to me to imply that she regards the condition of early infantile autism as related to central sensory disturbance, manifesting primarily as a form of "visual agnosia" for the human face, "apraxia", and "dysphasia". I have found this to be an all too brief but fascinating study.

Eva A. Frommer

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Normal and Abnormal Development of Brain and Behaviour. Ed. G. B. A. Stoelinga and J. J. van der Werff ten Bosch. Leiden University Press, 1971, pp. 348. No price stated.

This volume is the third in the Boerhaave Series and contains the proceedings of a postgraduate course for specialist medical practitioners held under the auspices of the University of Leiden in late 1970. The stated purpose of the course was two-fold. Firstly to provide data by which to assess the effects of internal and external environmental factors upon brain development and the extent to which this is manifested behaviourally. Secondly to consider the limitations of the methods currently used in such study. To a large degree, success in the first aim is determined by resolution of the second. The editors themselves single out two particular problems for examination. These are the proper definition and scoring of behavioural items, and the isolation of the factors contributing to some one behaviour. Neither of these, of course, is unique to developmental studies, but they are present in their most acute form in this field. The contributors, Dutch, American and British specialists, are drawn from a wide range of areas and the breadth of subject-matter covered in this work is considerable. This is not, unfortunately, always equalled in depth of approach.

Each contributor is accorded a chapter, twenty-one in all, and a short discussion section is included at the end of each paper. The book begins well with a presentation by Marshall of certain selected aspects of somatic development and the manner in which such findings caution against the excessive, though in the case of brain development the presently necessary, use of cross-sectional studies at the expense of longitudinal data. This is followed by a fine paper from Dobbing in which he manages to impart maximum information on the effects of undernutrition on developing brain in a minimum amount of space. Widdowson continues with this theme, but the pace set by these authors is not, on the whole, matched by the remaining eighteen chapters. Notable exceptions to this are Levine's contribution on neuroendocrine factors in behavioural development, that of Freedman on genetic influences, and an excellent paper by Goldfoot. This latter describes a study on the monkey and comprises the only attempt of the course to adequately define the behaviour that it seeks to investigate and to isolate the relevant variables—that is, the only paper which approaches the aims of the course. Goldfoot's success is to be seen in the beautiful interaction between organismic (ovarian hormonal) and social (dominance) factors which emerges from the data. For the paediatrician there is a manual on the behavioural and neurological examination of newborns presented by Brazelton and Freedman, and they will find the paper by Caesar and Akiyama (the only one of any substantial length and accompanied by a wealth of references) on the use of neurological criteria for the estimation in infancy of post-menstrual age of interest. Other areas of study covered range from the structure and development of the limbic system by Ariens Kappers, through the effects of congenital blindness and deafness, and on to the influences of emotional deprivation on growth and behaviour. A notable feature of the book is the brevity of the chapters. This, in combination with frequently disorganized material, gives a thoroughly unscholarly air to almost half of the contributions. This is, I think, to a large extent a fault of inadequate editing. One feels that greater care should have been paid to the problems of translating lecture presentations into a textual format.

This is not an important book, which is unfortunate since some of the papers deserve to be read. Its principal use is likely to be for paediatricians and child psychologists rather than developmentalists, and it may serve as a useful source of references. But it contains a woeful lack of adequate psychological data and the brain, after all, is largely about the generation of behaviours. The most sensitive indices of brain function and development constitute the psychological process. The value of this book, or indeed any which seeks to cover similar ground, is to be judged by the attention that it pays to this issue.

H. C. Plotkin

Temporal Order in Disturbed Reading. D. J. BAKKER. Rotterdam University Press, Holland, 1972, pp. 100. No price stated.

CORRELATIONAL studies on perceptual skills and reading achievement have for a long time dominated the field of reading research, but associations between these variables have proved to be of little aetiological or predictive value because of the lack of evidence supporting any causal relationships. The studies reported by Dr. Dirk Bakker have cited at least suggestive evidence that temporal order of perception (TOP) and cross modality integration of information are pertinent to reading skill acquisition. The author rightly asserts that despite the undesirable fact that correct temporal sequence is a pre-requisite to understanding written language, whatever be the script, surprisingly little attention has hitherto been paid to TOP in investigations of reading disability.

The first chapter is devoted to a clear and concise explanation of what temporal order actually means and here he differentiates between succession and temporal order; the latter implies an ordered succession. There is a delineation of task variable for TOP experiments in terms of explication and imitation according to whether or not the subject is explicitly asked for the location of each item in a series. The subsequent chapters deal with literature on the relation between TOP and reading ability as well as reports on the author's own extensive investigations in which the nature of the relationship between TOP and reading ability, age and sex has been exhaustively studied. The general findings from these studies indicate that TOP is related to reading ability in meaningful (verbally codifiable) material. The author then proceeds to give some supporting evidence that the association implies that TOP conditions reading ability and not the other way round. A prior classification of reading errors, and confirmation from empirical findings of the expected nature of errors of poor temporal order perceivers, suggest that this relationship may not be merely correlative. The presence of a relation between TOP at an early age and subsequent reading achievement is another point in support of a causal relationship.

In considering the effect of input modalities, the ability to perceive auditory temporal series is shown to bear the strongest relation to reading ability. It would, however, appear that the relationship between perceptual tasks involving visual–auditory integration and reading ability is of great moment. Early experiments on auditory visual–integration, and reading ability by Birch and Belmont, have suggested a positive relation—none the less the perceptual matching tasks, which were used to test auditory-visual integration ability, did not simulate the reading process closely enough. Dr. Bakker and his colleagues, using verbal material, demonstrate that apart from temporal ordering, between modality matching is essential for successful performance. Though the perceptual tasks used in Bakker's research simulated reading better than those used in previous studies, the transformation required in the TOAV (Temporal Ordering, Auditory-Visual) tasks was in the direction opposite to that which occurs in reading. Experiments which examine the importance of cross modality integration in the same manner as required in reading (that is, visual to auditory initially) should be of great value.

The most striking result of these investigations is the effect of sex upon TOP and the TOP-reading relation. At younger ages (5–8 years), girls score higher than boys on TOP. TOP also appears to influence reading ability at different points of time for girls and boys. These findings lead to the construction of a model postulating a critical TOP-reading interaction period which is present at an earlier age for girls than for boys. Such a model for reading disturbances may possibly be conceived as neurophysiological developmental disturbances, if links between critical periods and neurophysiological changes can be established.

The findings from this exhaustive series of experiment make a valuable contribution to an understanding of the perceptual processes involved during the learning to read stage and I would not hesitate to recommend the book to anyone interested in the area of reading skill acquisition.

SARADHA SUPRAMANIAM

Two Worlds of Childhood: U.S.A. and U.S.S.R. U. BRONFENBRENNER. Allen & Unwin, London, 1971, pp. xii + 190. £3.25.

HOW ARE we to judge the worth of a nation? One criterion, Bronfenbrenner suggests, is the concern of one generation for the next, and in this book he highlights this problem by comparing the way it is approached in the Soviet Union and the United States.

The result is a fascinating and most thought-provoking book. In it Bronfenbrenner attempts to do three things, namely to describe the socialisation practices of the two countries, to explain the mechanisms of personality development as they occur in the two respective contexts, and finally to advance some suggestions for remedial action. Of the three, the descriptive data he supplies about Russian practices are probably the most interesting part of the book. What emerges above all is the far greater emphasis in the Soviet system on teaching children the art of collective living. The main vehicle for this is the school, which is regarded as a setting not only for providing intellectual knowledge but also for teaching sharing, engaging in joint activities, and for fostering the spirit of group unity and of responsibility. How this is accomplished makes fascinating reading, as does Bronfenbrenner's description of its results. Aggression and anti-social behaviour amongst children are said to be genuinely rare, and as a more homogeneous set of standards is presented, children tend to be confronted by fewer conflicts than in Western countries. Viewing this process against the background of the troubles besetting American society, with particular reference to the alienation of youth, Bronfenbrenner was clearly impressed by the integrity of social standards across generations as found in Russia. Nevertheless, he is inclined to gloss over the negative side of this picture, in that a homogeneity of standards can so easily result in a too static society and in a too extreme response to any form of deviance.

When he turns to an examination of American socialisation processes, Bronfenbrenner dwells very much on the negative forces found there: the dissolution of the family, the violence portrayed on television, and particularly the gap between age groups as seen, for example, in the reduction of contact between children and parents and also in the minor role assigned to the teachers. With the dissolution of tight family bonds, Bronfenbrenner considers the peer group to have become a major force in shaping children's lives, and here he certainly performs a valuable service in drawing attention to this influence. But while in the Soviet Union the peer group reinforces adult-approved patterns of conduct, in the U.S.A. it tends to intensify anti-social tendencies. In explaining the influence of these forces, Bronfenbrenner makes heavy use of Bandura's modelling theory—an explanation that will not please everyone, and that is in any case contradicted by such findings as those by the Feshbachs on the effects of violence on television.

Most controversial, however, are Bronfenbrenner's suggestions for social action to deal with the problem of American youth. Age segregation, he indicates, poses the greatest problem, for it cuts the child off from the positive influence of adults and results in alienation, indifference, and antagonism. It is essential, therefore, for adults to become involved once again in the lives of children, and it is here that he draws on his Russian experiences and suggests how a community spirit may be mobilised for this purpose. Bronfenbrenner is to be congratulated for his courageous attempt to deal with this important issue, and if the reader feels that the gap between ideas and practices still remains at the end, it must be seen as an indication of the dimensions of this issue. And just in case any British reader considers this to be merely an American problem, one might draw attention to a passing reference to a cross-cultural study involving English children and their parents. According to this, the lack of parental involvement and the amount of juvenile anti-social behaviour in England is said to be even greater than found in the United States!

H. R. SCHAFFER

Schizophrenia in Children. Papers by J. LOUISE DESPERT .Brunner/Mazel Inc., New York, Butterworths, London, 1968, pp. vi + 215. $6.95.

THIS BOOK collects in one volume what Leo Kanner, in the Foreword, describes as "her pertinent publications since 1937". Dr. Despert is both a clinician and a therapist, and she has been writing about schizophrenic children over a long period of time. The source of her individual papers, where they were originally published, and to whom they were addressed, is always clearly stated; in some the discussion that followed is given. Thus, they give a picture not only of how the author's concept of childhood schizophrenia has developed over the years, but also some idea of how the general approach to this controversial clinical topic has altered and developed. One might see it as a loss that there has been nothing added to indicate an awareness of new work proceeding at the present time, since it is a subject which continues to arouse both controversy and exploration in new directions. No reference is made to any papers later than 1958, and with one exception, each paper makes up a chapter, arranged in chronological order, from 1937 to 1958. The final chapter, a particularly interesting one on therapy, dates from 1952. While on this point of arrangement, it is a serious defect that chapter headings are not printed other than at the start of a chapter, and references are given in the out-dated way by number rather than author's name. Reading is thus constantly interrupted by a rather fretful search for the end of the chapter where the author's names are of course given; and there is no index. These are minor points, but they do perhaps underline the degree to which this book is of historical interest, and immensely worthwhile at that; but no attempt is made to keep up with the times.

For example, no very clear definition is given of the range of cases to which the diagnostic terms are being used. The clinical descriptions are so vivid and so poignant that one accepts the omission of accompanying details of tests, whether physical or psychological, and particularly, of any comparison with disturbed children of a different kind. This is not the case in every chapter and two pieces of research are described. In one (Chap. 2, Pub. 1940) a comparative study is made of thinking in schizophrenic children, and normal children of preschool age. Here the important point is made that the disorganized thinking of a schizophrenic child is quite different from the primitive thinking shown at an earlier level of development. Here is something other than a simple regression, and different again from the disturbing but more or less coherent conflict displayed by children with a behaviour disorder (see Chap. 7). Despert's approach is always that of the therapist, in her case psychoanalytically orientated, and she gives here and elsewhere throughout the book a deeply insightful awareness of the "cut-off" from normal emotional experience and expression seen in the psychotic child.

A particularly interesting chapter (No. 7, Pub. 1948) dealing with delusional and hallucinatory experiences is rich in reference to work of a much earlier era, showing how Freud's concept of early developmental pattern opened up a wholly new approach to both diagnosis and the consequent rationale of therapy. The final chapter describes in detail the therapy of a boy covering the years from age 3 yr 10 months to a renewal of contact and therapy again, some years later, when sadly the boy's age is not exactly given, although from the context he must have been in his tenth year. In this author's view, "Schizophrenia is now recognized as a psycho-pathological syndrome"; clearly her own choice is for "ambulatory treatment" with a psychoanalytic orientation. This was in 1947. Much water has flown under the bridges since then, but few child psychiatrists succeed in penetrating the pathological withdrawal and "autistic aloneness" as successfully as has Louise Despert. We must all be grateful for this assembling of her earlier work.

MILDRED CREAK

Statistics. DONALD J. KOOSIS. Wiley, New York/London, 1972, pp. x + 282. £1.25, $2.95.

MR. KOOSIS in consultation with Mr. Colardarci has managed to produce a fairly readable programmed text about statistics for biological scientists. The frames are relatively long, avoiding the fault of presenting information in staccato form. The examples are usually well-chosen and interesting or amusing enough to be understood.

The best aspect of the book is its choice of content. Many readers of such a text will be unsure of some aspects of statistics which are often glossed over by mathematicians, and Koosis has paid attention to such problems. For instance, there is some space devoted to learning to read tables. However, a fair knowledge of arithmetic and algebra is required throughout the book.

Although this is a book for beginners, Koosis does not shy away from including important aspects of statistics which are usually omitted from cookbook introductions. Type II errors and the power of a statistical test are thoroughly discussed. There are also several sections called "Choosing the right test". These will be especially useful to one first encountering statistics.

The choice of topics covered is fairly well balanced. Koosis's "Basic Skills" chapter includes most of the descriptive statistics. Estimation and famous frequency distributions are covered in two early chapters. Hypothesis testing is the subject of the remainder of the book with *t*-tests, binomial tests, variance tests, analysis of variance, and χ^2 tests included. Correlation and regression is also described. However, it is sad that no non-parametric statistics are included to deal with ordinal data.

As a book for beginners, or students who feel lost following an introductory course, Koosis's *Statistics*, will probably be a useful text. If he works the examples and review problems (with answers), he will probably gain a good first understanding of the subject and will be able to readily absorb additional information.

C. Weir

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SPECIAL EDUCATIONAL TREATMENT OF AUTISTIC CHILDREN: A COMPARATIVE STUDY—1. DESIGN OF STUDY AND CHARACTERISTICS OF UNITS

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1. INTRODUCTION

Background

AT THE START of this investigation there were suggestions from follow-up studies that the provision of special schooling of autistic children was associated with scholastic and social benefits (Lockyer and Rutter, 1969; Rutter, Greenfeld and Lockyer, 1967). However, there had been no controlled evaluations of schooling and more direct investigations were required to assess the results of special educational treatment. That was the aim of the present study.

In spite of the pressing need and the availability of techniques for therapeutic studies (Robins and O'Neal, 1969; Tizard, 1966), there have been very few attempts to evaluate specific forms of treatment for autistic children (Goldfarb, 1969). There have been studies of a variety of therapeutic régimes including residential treatment (Davids, Ryan and Salvatore, 1968), programmed or structured teaching (Fischer and Glanville, 1970; Graziano, 1970; Halpern, 1970), group therapy (Speers and Lansing, 1965) and operant methods (Wolf, Risley, Johnston, Harris and Allen, 1967; Ney, Palvesky and Markely, 1971; Lovaas, Koegel, Simmons, Stevens and Long, 1973). However, these vary in their rigour and control and most include inadequate information on the children studied (Yule and Berger, 1972) and suffer from a number of defects characteristic of educational follow-up studies (Guskin and Spicker, 1968). They have provided useful information but most have not assessed the relative merits and demerits of different therapeutic approaches. Goldfarb, Goldfarb and Pollack (1966) compared residential and day treatment and others have attempted to evaluate different forms of education and psychotherapeutic milieus (Havelkova, 1968; Wenar *et al.*, 1967), but there is little information on the effects of different types of schooling.

In the few years prior to the beginning of this study and during the course of the investigation there has been a rapid growth in the number of special schools and classes for autistic children. At the last count there were 45 altogether, 27 of them in or near London (National Society for Autistic Children, 1972). However, the special units which have been set up vary a good deal in their theoretical orientation, in their structure and in the type of relationships the staff provide for the children. When our study began there was little evidence upon which to judge the merits and demerits of these different approaches. Accordingly, this study set out to make some assessment of what type of schooling is best geared to the needs of autistic children.

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The variations between units chiefly concern five areas:

(i) Theoretical orientation.
(ii) Emphasis on formal teaching.
(iii) Degree of structure in the environment.
(iv) Segregation from or mixing of autistic children with other children.
(v) Staff–child ratio.

The main theoretical difference lies between those who view autism as an emotional disorder due to failure in the early development of adequate parent–child relationships and those who regard autism as a developmental or "organic" disorder involving specific handicaps in language and perception. With regard to teaching, the difference lies between those who regard the prime aim as the fostering of a strong emotional bond between adult and child (teaching beginning only when this has been established) and those who consider that the main need is for deliberate teaching of specific skills.

Similarly, some workers emphasise the need for a permissive flexible environment so that the autistic child can develop in his own way, whereas others believe that a firm external structure must be imposed just because the handicaps of the autistic child prevent him from developing internal controls in the normal way. In some units, autistic children are mixed with other children in order to provide normal peer models for adequate communication and social interaction. In others, it is thought that mixing serves only to dilute the special care necessary for autistic children and that, at least in early and middle childhood, autistic children are unable to make use of peer interaction. Finally, there is a difference between those who believe that a one-to-one relationship is crucial at all times (so requiring a one-to-one staff–child ratio) and those who believe that it is necessary from the outset to plan progression from a one-to-one interaction to individualised teaching in a small group setting (so allowing a lower staff–child ratio).

Aims

The study was designed to assess the value to autistic children of special educational treatment and to evaluate the effects of different approaches to such treatment. In particular, answers were sought to five key questions:

(i) How much formal educational progress can be made by autistic children?
(ii) How far is this dependent upon the type of special schooling provided?
(iii) How far is formal educational progress dependent upon the nature and severity of the autistic child's handicaps?
(iv) How far does improvement in formal educational attainment correlate with social and behavioural progress?
(v) Does the pattern of social, behavioural and educational progress vary according to the educational methods used?

Study design

In order to answer these questions, a search was made for well established units which differed in the areas outlined above. In order for it to be feasible to draw conclusions about the effects of different types of schooling it was necessary to select units taking a sizeable number of autistic children. After exploring several possibilities, three units were selected for study. As judged, both by the descriptions of the units given by their directors and by our observations, the units differed considerably in their mode of functioning. One was primarily a psychotherapeutic unit with little emphasis on teaching, one provided a structured and organised setting for the teaching of specific skills, and one used a more permissive classroom environment in which relationship and regressive techniques were combined with special educational methods.*

The study involved three stages. First, the children were studied during 1967 using a combination of interview, observation and psychometric methods. This served both to identify the children meeting the diagnostic criteria for autism (see below) and to provide a baseline against which to measure progress. Second, there was a systematic study of the characteristics of each unit using time-sampled observations in the classroom. These observations were made twice, once in the middle of the study and once towards the end, to determine whether there had been any important changes in teacher–child interaction during the course of the investigation. Third, the children were followed up twice, once in 1969 after some 20 months, and once in 1970/71, giving a 3½–4 yr follow-up to assess their educational, social and behavioural progress. A combination of psychometric techniques, classroom and interview observations and systematic reports from parents was used. In order to assess the various aspects of the child's development which might be differentially influenced by the contrasting régimes in the three units, a wide range of measures was used to determine the children's progress.

2. SAMPLE

The units

The three units studied will be referred to throughout this report as Unit *A*, *B* and *C*.†

Unit A. This unit was selected as an example of one using regressive techniques with minimal attention directed towards the teaching of specific skills. A child psychotherapist was in charge of a number of lay helpers who, under direction, attempted to develop a close interpersonal relationship with the child allotted to them on a one-to-one basis. There was a staff–child ratio of 1:1 with 10 children and 10 staff members present.

The director fostered the maintenance of a sympathetic, consistent and non-directive approach to the child. When a relationship was firmly established, the child was helped to regress to the developmental stage he was at when autism developed by treating him as if he were at that stage. Thus, a child might be bottle-fed and allowed to curl up on the therapist's lap if autism seemed to have developed during the first year. Then, with the aid of therapeutic support he could be helped to progress through the normal stages of social and emotional development. Autism was believed to be a primarily emotional disorder and relatively little attention was directed to cognitive and linguistic aspects of the child's development. After a period of regression, when improvements were thought to be occurring, the child was taken twice weekly for a 20 min individual session with a Rudolph Steiner-trained teacher. Since the study began, this situation has altered so that there is now more teachign and the approach is somewhat more directive. Nevertheless, throughout the study it remained distinctive and different from the other two units.

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* The descriptions of the three units given in this paper apply strictly to the period when they were studied. Important changes in staff and teaching have taken place since that time so that it would be wrong to regard the descriptions as necessarily applicable now. However, the investigation was not initiated to assess the merits or demerits of any one unit as such, but rather to use inter-unit comparisons to derive general principles applicable to the education of autistic children in any unit and it is in that context that the paper should be read.

† For a description of the units and their philosophies see also Bartak and Rutter (1971).

The children attended the unit for 4 hr per day for 4 days per week. The majority of the child's time was spent in free play with or in the presence of his particular voluntary assistant. Each mother was seen at weekly or fortnightly intervals by a psychiatric social worker as part of a supportive and re-educative therapy, directed to the maladaptive family influences thought to have been involved in the pathogenesis of autism.

The unit was for autistic children only and was set in a group of four rooms in a psychiatric hospital. A fenced-in area outside with a couple of swings and a "Wendy" house was available for play activities. Little time was spent in group activities other than at lunch time when the children all ate together with their individual voluntary helpers.

Unit B. This was an autonomous educational unit with several classrooms in which a permissive classroom environment was used to combine special educational methods with regressive techniques. No standard structure was imposed. Rather an attempt was made to match the régime to the needs of the individual. Such régimes might vary from a fairly structured task situation to a free play setting. At Unit *B* autistic children were mixed with children with other difficulties. The Principal had noted that noncommunicating children need the company of verbally communicating children who, while disturbed, nevertheless form relationships and follow normal childhood interests. In this unit, it was considered that the child should set his own pace to a large extent.

Children attended the unit from 9.30 a.m. to 3.00 p.m. 4 days per week and until noon on the fifth day, but holidays were appreciably shorter than in most schools. There was provision for about 4 children to board and usually children boarded for only a few weeks at a time. Residential facilities were provided by the long-stay subnormality hospital in which the unit was situated. However, the unit was run completely separately from the hospital administration, its only connection being that it was physically located in a spare ward rented from the hospital and that nurses cared for children in residence after school hours.

At the beginning of the study, there were 25 children in the unit with 7 staff members. Some parents also helped in the unit. The director was a teacher who spent the majority of the time in supervision and administration. The director did little actual classroom teaching but had extensive contact with the children in out-of-class activities such as during meal-times or by taking them on shopping or other excursions.

The unit occupied a wing of a subnormality hospital in which rooms were set up as classrooms with tables and chairs, bookshelves and bright pictures and noticeboards on the wall. There was a large fenced-in grassy area outside containing playground equipment such as slides, swings and a climbing frame. The residential section of the unit consisted of several very small rooms, adjoining a nurse's office, in which the children could sleep. After school hours, the only rooms used were the duty nurse's office, the ward bathrooms, the classrooms and a kitchen at the end of the unit away from the bedrooms.

Unit C. This school was for autistic children only and exemplified the approach in which perceptual, motor and cognitive handicaps were seen as primary and around which education was to proceed. It was suggested that the child's environment must be structured, organised and logical rather than permissive. The main emphasis was placed on teaching the child specific skills using techniques which aimed to circumvent the perceptual and cognitive defects.

Children attended school from 9.30 a.m. to 3.30 a.m. 5 days a week and a number of children were weekly boarders (more at the end of the study than at the beginning). Much of the timetable was devoted to formal classwork (i.e. the children were at desks or tables carrying out set activities) and the environment could be described as structured. As at Unit *B*, there were 25 children and 7 staff at the start of the study. At Unit *C* the director was a teacher who spent a considerable amount of time in active classroom teaching along with the rest of the staff.

Unit *C* occupied several suburban houses. The boarding department consisted of two flats in one of the houses. The other houses were used for school activites within school hours and most of the rooms were set up as classrooms with similar equipment to that in unit *B*. Each house had an outside area with playground equipment. Each flat included shared bedrooms for children and a living room, kitchen and bathroom.

The children

Children for whom the diagnosis of autism had been made at some time were considered for inclusion in the study. They were finally selected if they had a disorder beginning before the age of 30 months in which all three key autistic features (Rutter, 1971) were present. These were:

(i) A profound and general failure to develop interpersonal relationships (shown in early childhood by a failure to cuddle or come for comfort, a lack of eye to eye gaze giving the appearance of aloofness, a relative failure to develop friends or attachments, an apparent lack of interest in people, and often a somewhat unvarying facial expression).

(ii) A delay in language development (generally followed by pronominal reversal, echolalia and paucity of conversation even after speech developed).

(iii) The presence of ritualistic or compulsive phenomena (as shown by stereotyped repetitive activities, abnormal attachments to unusual objects and resistance to change).

There were 50 children finally included in the main study, 6 boys and 2 girls at Unit *A*, 10 boys and 8 girls at Unit *B*, and 18 boys and 6 girls at Unit *C*.* The mean age of the children at outset was roughly the same in all three units (7–9 yr) and there were no statistically significant differences between units in this respect. Nevertheless, Units *A* and *B* had a greater proportion of young children and Unit *C* was the only one with adolescents. The mean non-verbal I.Q. was 48 at Unit *A*, 52 at Unit *B* and 66 at Unit *C*, the difference between *B* and *C* being statistically significant at the 5 per cent level ($t=2 \cdot 19$, 40 *d.f.*). In both Units *B* and *C* most children had I.Q.s in the E.S.N. range but the majority of the severely retarded children were at Unit *B* and the few children with I.Q. above 90 were all at Unit *C*. In all three units about half the children were without useful speech at the beginning of the study. The period of time the children had been attending the units prior to the start of the study was closely similar in all units (a mean of 21 months in *A*, 19 months in *B* and 18 months in *C*). The findings are summarised in Table 1 and the methods used to assess the children are given in Rutter and Bartak (1973).

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* These figures differ slightly from those given in Bartak and Rutter (1971) because of changes shortly after the study started—one child died and two children left, with a corresponding intake of three children. The I.Q. figures also differ both for the same reason and because children with scores at the floor of the test were considered "untestable" in the 1971 report but were given the bottom score in this analysis.

TABLE 1. CHARACTERISTICS OF THE CHILDREN IN THE UNITS

Children	Units		
	A	*B*	*C*
No. in unit at start of study	7	16	20
Mean duration of attendance at start	20·9 months	19·3 months	18·2 months
Mean age at outset	7 yr 5 months	7 yr 10 months	9 yr 5 months
Age range at outset	(3·5–9·8)	(4·0–11·3)	(5·8–15·0)
Mean I.Q.	48	52	66
Total No. of children in study	8	18	24

In summary, the children were roughly comparable across the three units, but there were some differences at the extremes of the ranges of age and I.Q. which needed to be taken into account in assessing differences in the progress of the children. During the course of the study some children were transferred to other schools (Rutter and Bartak, 1973) but apart from the one child transferred from Unit *A* to Unit *C* (who was excluded from the analysis) and the few children who left before initial data collection was complete (see footnote p. 165), all children were followed up regardless of their placement.

3. METHODS

Assessment of units

The units were assessed in two ways. Firstly, staff were questioned (and answers supplemented by observation) regarding timetables, methods and equipment used to teach children, materials available for play and informal educational activities. Secondly, direct observation methods, involving time and event sampling, were used to assess the nature of staff–child interactions. Two scales were constructed. The first was designed to assess both what the staff members said to and did with the children, and how they did it. The second scale measured the staff response to different kinds of child behaviours.

For the first scale, series of 15 sec time samples alternating with 15 sec recording periods were built up. Each series consisted of 16 such alternations without breaks. Sequences of such series were built up so as to sample systematically all unit activities and all staff members. Teacher activities were recorded according to a list of operationally defined activities (listed in Appendix 1). They were grouped as acts of instruction (e.g. asking questions, showing how to do something), playing with the child, acts of approval (saying something approving, cuddling the child) and acts of disapproval (e.g. making disapproving statements or gestures). In this scale, several different staff behaviours could be recorded in a given 15 sec observation period. Thus a staff member might smile, say "good boy" and pat the child simultaneously. All three events would then be recorded. With all verbal acts, tone of voice was recorded.

The first scale, therefore, assesses the style of the staff–child interaction but not the context in which the interaction took place. Other studies have suggested that this may be crucial (e.g. Becker *et al.*, 1967). In ordinary classes the total amount of praise and punishment is generally less important than *how* these are distributed, that is which behaviours are encouraged and which discouraged. Accordingly, a second scale was devised which employed event sampling to assess the contingent qualities of the staff's response to the children's behaviour. The children's behaviour was considered under four main headings, each of which was sub-divided into socially acceptable and deviant behaviour. Thus, *general activity* was differentiated according to whether the child was carrying out the activity intended for him, or whether he was turning away from such activities. Similarly, *affect* was subdivided into appropriate smiling, friendly behaviour on the one hand and tantrums and the like on the other. The staff response, immediately following the child's behaviour, was characterised according to various categories of approval or disapproval, both verbal and non-verbal. For verbal responses, tone of voice was again noted. Child behaviour–staff response sequences were recorded so that there were at least 50 sequences for each member of staff at the final follow-up in 1971.

In order to ensure that the measures provided a valid reflection of the staff and children in each unit, we had spent prolonged periods observing and recording behaviour before the assessments used in the analysis were started. The directors of each unit had been told at the outset that observations would be made on a variety of classroom activities, both of children and of staff, but neither knew what was being recorded at any one point in time.

The *inter-rater* reliability of all measures based on time or event sampling was tested by having behaviours rated simultaneously but independently by two observers. Satisfactory levels of *inter-rater* agreement were obtained, the Kappa index (Everitt, 1968) being greater than 0·75 in all instances.

4. RESULTS OF STUDY OF UNITS

Time-tabling

The main time-tabling difference (Table 2) between the units lay in the amount of formal classroom teaching. At Unit *A*, the children received only 40 min per week in 1967, but rather more in 1971. At Unit *B* there were wide variations between children in the amount of formal teaching but the average was 4 hr per week. At Unit *C*, there was 9 hr formal teaching per week.

However, at both Units *B* and *C*, a similar amount of time was spent on art, gymnastics, music, domestic activities and free play. In both cases these activities occupied 16 hr per week, well above the amount allocated for more formal teaching

TABLE 2. TIME-TABLE (HOURS PER WEEK)

	Units		
	A	*B*	*C*
Formal classwork	0.7	4 (1–7)†	9
Art, Woodwork, etc.	*	6 (4–7½)†	4
Gymnastics	0	1	2
Music	0	2 (1–4)†	2
Domestic activities	0	0	3
Free play	*	4½	5
Meal times	4	5	5
TV	0	2½	0‡

* No set time-table followed.

† The proportions of time varied greatly according to which group the child was in—the range being given in brackets.

‡ No set period but selected programmes watched on various occasions, more so now than at the beginning of the study.

At the outset of the study, Unit *B* made more systematic use of TV, 2½ hr per week being set aside for this purpose.

Teaching methods

A wide range of teaching techniques were used in all units. Two and three dimensional equipment was used to aid the early discrimination of size and shape. All units made considerable use of simple jig-saw puzzles with large pieces. Flash cards, pictures and sand-papered letters were used with a combination of "phonic" and "look and say" methods to teach reading. Cuisenaire rods, Montessori and other similar materials were used to aid number work. There was also much standard equipment, such as counters, interlocking plastic cubes, number–picture and figure–value matching cards. Other equipment consisted of flash cards or other material which were constructed for particular purposes by individual staff members.

The units differed in the amount of teaching provided and in the degree of structuring designed to ensure that the children attended to the teaching. In each case, Unit *C* provided most and Unit *A* least. However, the methods of teaching were broadly similar in all three units and there were no differences of note. Each unit used a wide range of teaching methods, those used for individual children being chosen as far as possible in accord with their needs and abilities.

Staff behaviour

The first point that emerged from the time-sampling of staff behaviour was the high rate of staff activity in all three units. For most of the time, the staff were actively doing something with the children. In less than 1 in 6 15-sec samples was there no interaction recorded. This illustrates the demanding nature of the job performed by the staff and also reflects the problems of autistic children in working or playing without immediate and direct supervision. The children's response to staff requests to carry out an activity was studied. In Units *B* and *C* the children usually complied but they only persisted in the activity for an average of less than 3 min. The children in Unit *A* less often complied with instructions and when they did comply they did so on average for less than 2 min. The possible reasons for this difference between Unit *A* and the other two units are considered elsewhere (Rutter and Bartak, 1973). However, the findings from all three units indicate the necessity of close supervision of autistic children. This will only be possible where there is an adequate number of staff.

At Units *B* and *C*, most of the interaction consisted of some kind of act of instruction, directing the child being the most frequent, followed by showing the child something, and thirdly by some kind of questioning (Table 3). Unit *A* was quite different in this respect. Acts of instruction were less frequent ($\chi^2=53\cdot2$; 2 *d.f.*; $p<0\cdot001$) and playing with the child was relatively more frequent ($\chi^2=50\cdot5$; 2 *d.f.*; $p<0\cdot001$) than in the other units. However, this difference is a function of the fact that Unit *A* is not primarily an educational unit. When the behaviour of the teacher at Unit *A* was examined, the results were very similar to those for the staff of the other two units, there being a high level of acts of instruction and very little play.

TABLE 3. STAFF BEHAVIOUR (TIME-SAMPLING, 1969)

	Units		
Acts*	*A*	*B*	*C*
Acts of instruction	51	127	120
Plays with child	26	5	0
Acts of approval	59	37	14
Acts of disapproval	11	10	10
Total units of observation	160	103	150
Tone of voice (% of verbal interactions)			
Neutral	73	87	79
Critical	0	3	21
Warm	27	10	0

* Figures in body of table refer to acts per 100 15-sec observation periods. The figures do not add up to 100 per cent as more than 1 act could occur in each observation period.

Throughout this paper Yates correction has been used when appropriate in the calculation of chi-square.

The amount of disapproval shown (Table 3) was similar in the three units but there were marked differences in the frequency of approval. Acts of approval were much more frequent at Unit *A* than at either of the other two units ($\chi^2=42\cdot8$; 2 *d.f.*; $p<0\cdot001$). At Unit *A*, acts of approval far outweighed acts of disapproval, in Unit *B* acts of approval also outnumbered acts of disapproval in 1969, but at Unit *C* approval and disapproval were approaching equality. By 1971, the pattern at Unit *B* was similar to that for Unit *C*.

In all units, telling the child he was good was the commonest method of showing approval, but physical demonstrations of approval (e.g. hugging the child) were extremely uncommon at Unit *C* (5 per cent of all acts of approval), more frequent at Unit *B* (55 per cent) and a regular occurrence at Unit *A* (64 per cent) ($\chi^2=18\cdot8$; 2 *d.f.*; $p<0\cdot001$). This very marked trend was found at the conclusion of the study also but there was one notable difference. Early in the study, physical demonstrations of approval were more frequent and occurred more frequently than verbal approval.

This was not so at the end when physical acts of approval made up 24 per cent of all acts of approval in contrast to the earlier figure of 54 per cent over all units ($\chi^2=42\cdot0$; 1 *d.f.*; $p<0\cdot001$). The explanation probably lies in the age of the children. Hugging may be a more appropriate form of approval in younger children and the children were nearly 4 yr younger at the outset than at the end of the study. Nevertheless, at all stages in the study, the relative differences between the units remained the same. Physical approval was common at Unit *A*, frequent at Unit *B* and rare at Unit *C*.

Similar differences were found with respect to tone of voice (where the findings are based on a total of 635 verbal interactions). At Unit *A*, warm tone was frequently evident (Table 3), it was less common at Unit *B*, and was very rare at Unit *C*. Conversely, critical tone of voice was common at Unit *C*, less common at Unit *B*, and very rare at Unit *A* ($\chi^2=133\cdot7$; 4 *d.f.*; $p<0\cdot001$).

In summary, the staff at Unit *A* spent much of their time in warm approving play with the children, whereas instruction was the main activity at the other units. Units *B* and *C* differed largely in the way the children were instructed, warmth and physical approval being more characteristic of Unit *B*.

Staff responses—Contingency analysis

Event sampling of staff responses to children's behaviour showed that in all three units acceptable behaviour was generally followed by staff approval. But the units differed in their responses to deviant behaviour. At Units *B* and *C*, deviance was generally followed by disapproval but this was not the case at Unit *A*. In that unit,

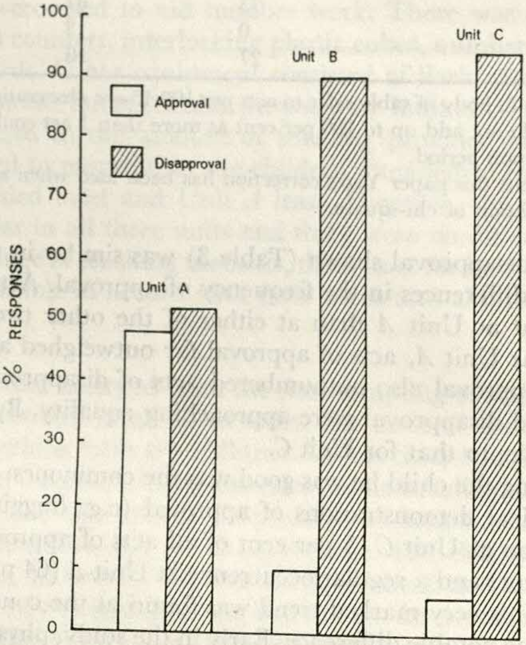

FIG. 1. Teachers' response to deviant behaviour.

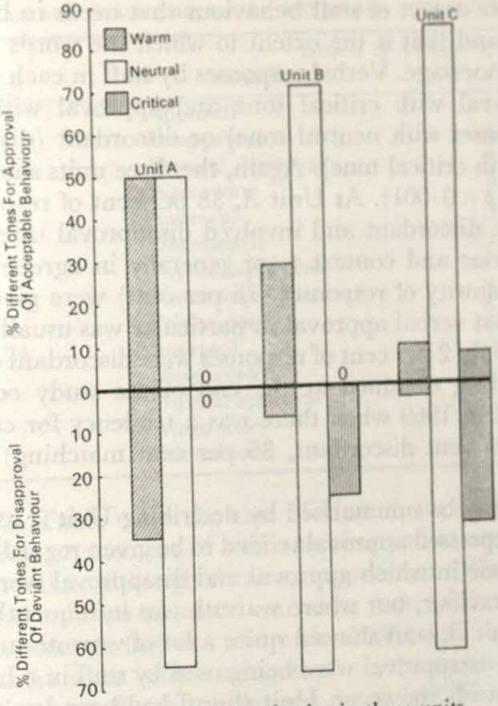

FIG. 2. Teachers' tone of voice in three units.

deviance was as likely to be followed by approval as by disapproval. Thus it seemed that children there might find it difficult to discriminate right and wrong since behaviour of all kinds was liable to be followed by praise. These results are shown in Fig. 1 ($\chi^2=78\cdot2$; 2 *d.f.*; $p<0\cdot01$).

An examination of the tone of voice used by staff corroborates these findings. Figure 2 shows the tone of voice used by staff in response to acceptable and to deviant behaviour in each unit.

Two points are evident with respect to Unit *A*. Firstly, critical tone was never expressed in response to either acceptable or deviant behaviour. Secondly, the staff response was similar for both acceptable and deviant behaviour, many verbal responses being expressed warmly whatever the child's behaviour ($\chi^2=1\cdot97$; 2 *d.f.*; *n.s.*).

The pattern at Unit *C* was quite different. The staff clearly differentiated between acceptable and deviant behaviour ($\chi^2=36\cdot67$; 2 *d.f.*; $p<0\cdot001$). Deviant behaviour quite commonly resulted in critical tone and only rarely in warmth. For acceptable behaviour, neutral tone of voice predominated and warmth and critical tone both occurred with about the same low frequency.

In Unit *B*, tone of voice was most clearly used as a differential response to children's behaviour ($\chi^2=40\cdot26$; 2 *d.f.*; $p<0\cdot001$). Acceptable behaviour was followed by warmth in nearly a third of cases and critical tone was never used. When the child's behaviour was deviant, critical tone was employed 26 per cent of the time and warmth only 7 per cent.

There is a further aspect of staff behaviour that needs to be taken into account in this connection, and that is the extent to which the words used and the tone of voice give the same message. Verbal responses by staff in each unit were grouped as matching (disapproval with critical tone and approval with warm tone), non-matching (all responses with neutral tone) or discordant (disapproval with warm tone or approval with critical tone). Again, the three units showed clear differences ($\chi^2=25 \cdot 77$; 4 *d.f.*; $p<0 \cdot 001$). At Unit *A*, 38 per cent of responses were matching but 9 per cent were discordant and involved disapproval uttered in warm tone of voice. At Unit *C*, tone and context were generally in agreement (6 per cent discordant) but the majority of responses (76 per cent) were given with neutral tone and Fig. 2. shows that verbal approval in particular was usually given in a flat tone of voice. In Unit *B* only 2 per cent of responses were discordant and 28 per cent were matching. This finding obtained at the end of the study contrasted with those obtained for Unit *B* in 1969 when there was a tendency for critical remarks to be said warmly (21 per cent discordant, 36 per cent matching) ($\chi^2=30 \cdot 01$; 2 *d.f.*; $p<0 \cdot 001$).

These findings may be summarised by describing Unit *A* as one in which indiscriminate warmly expressed approval tended to be given regardless of what the child did, and Unit *C* as one in which approval and disapproval were usually contingent upon the child's behaviour, but where warmth was infrequently expressed through tone of voice. At Unit *B*, staff showed quite a lot of warmth and by the end of the study, approval and disapproval were being used by staff in a highly discriminating way. Earlier in the study, however, Unit *B* staff had been less consistent.

Staff behaviour—Individual differences

The findings on staff–child interaction discussed so far have been based upon averages achieved by pooling the results for all staff in each unit. This approach has demonstrated sizeable differences in staff behaviour between units. This is important, but what is more directly relevant to an individual child is the behaviour of the particular staff member with whom he is most frequently in contact.

It was not practicable to carry that kind of analysis very far because staff left and joined all three units during the course of the study, and because children changed classes. However, although it was not possible to relate individual differences between children to those between staff, some analysis of differences between staff within each unit was carried out. For each individual, data from time-sampling of staff behaviour at final follow-up were arranged to give the percentage of 15sec time periods in which any acts of *approval* or acts of *disapproval* occurred. In addition, the percentage of time periods in which *physical demonstrations of approval* (e.g. hugging) occurred was established for each individual, as were the percentages of all verbal interactions with *warm* and *critical tone* of voice. Thus, scores on 5 measures were available for each individual in all units. In addition, several replicate scores were available on each measure since each replicate was based upon a series of observations and the total time samples were built up from several such series obtained over a number of occasions. Within each unit and for each measure it was thus possible to do an analysis of variance between individual staff (using the variance within staff across replicates as an estimate of error). Results of these

TABLE 4. STAFF BEHAVIOUR—INDIVIDUAL DIFFERENCES

Unit	*d.f.*	Variable	*Results of analyses of variance* *F*	*p*
A	5,17	Approval	1·83	*n.s.*
		Disapproval	1·59	*n.s.*
		Physical approval	2·12	*n.s.*
		Warm tone	3·92	$p<0\cdot025$
B	6,19	Approval	3·77	$p<0\cdot025$
		Disapproval	<1	*n.s.*
		Physical approval	1·57	*n.s.*
		Warm tone	5·89	$p<0\cdot005$
		Critical tone	1·65	*n.s.*
C	7,24	Approval	5·26	$p<0\cdot005$
		Disapproval	1·66	*n.s.*
		Physical approval	55·42	$p<0\cdot001$
		Warm tone	23·24	$p<0\cdot001$
		Critical tone	3·46	$p<0\cdot02$

analyses are shown in Table 4. In the case of Unit *A*, no analysis was possible for *critical tone of voice* since no member of staff was observed to use it.

These results show that although there are significant differences between individuals in each of the units on at least 1 variable, most of the differences occurred at Units *B* and *C*. In order to find out where the differences lay in each unit and to identify which members were contributing most to the variance between staff for each variable, the Newman–Keuls studentized range test (Kirk, 1968) was carried out on each set of data which had yielded a significant *F* ratio.

Acts of approval (*all*). Unit *A* staff did not show any differences. For Unit *B* the studentized range test showed that the only differences between staff lay between the least approving teacher and each of the two most approving teachers ($p<0\cdot05$) so that the significant *F* ratio was based on the whole range of scores. No single individual emerged as different from all other staff. At Unit *C* the pattern was quite different. Here the test indicated that the most approving teacher was different from every other member of staff ($p<0\cdot01$) including the next most approving teacher. No differences between any other teachers were significant.

Physical demonstrations of approval. Unit *C* staff were the only ones to show individual differences. The Newman–Keuls test indicated that one teacher was more physically demonstrative of approval than any others ($p<0\cdot01$) including the next most demonstrative member of staff and that no other differences between teachers were significant. The teacher concerned was the same person who stood out in the analysis for all acts of approval and in fact was the Head of the unit.

Warm tone of voice. At Unit *A* the person with the lowest percentage of warm responses differed from each of the two members of staff with the highest percentages ($p<0\cdot05$) and no other differences were significant, so that the significant *F* ratio was based on the whole range of scores and no single person stood out.

At Unit *B* a similar result obtained. The test showed that staff members 7, 5 and 4 with the three lowest percentages of warmth each differed significantly from staff member 1 who showed the highest percentage ($p<0\cdot01$) and from teacher 2 who showed the second highest percentage ($p<0\cdot05$). The fourth lowest teacher (6)

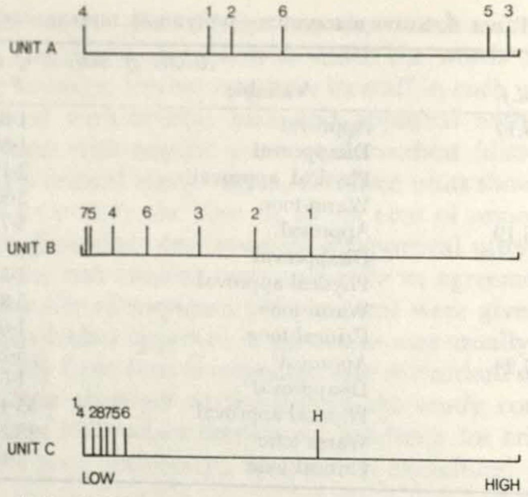

FIG. 3. Staff differences in use of warm tone of voice (1971).

also differed from teacher 1 ($p<0\cdot05$) only. Again, no single person stood out in contrast to all others.

Unit *C* again was different. In this case the Head differed as before from every other member of staff ($p<0\cdot01$) including the teacher with the second highest percentage of warm responses and no other differences were significant. Individual means for staff of the three units on percentage of responses with warm tone are shown in Fig. 3.

Critical tone of voice. At Unit *A* no verbal responses recorded included critical tone. At Unit *B* there were no significant differences between staff members. For Unit *C* the Newman–Keuls test indicated that, once again, a particular member of staff differed significantly from each other teacher. Teacher 7 showed the highest incidence of critical tone of voice and differed from the next 5 most critical teachers at the 5 per cent level of probability and from teachers 1 and 2, the two least critical teachers, at the 1 per cent level. No other differences between staff were significant. Individual means for critical tone in Units *B* and *C* are shown in Fig. 4.

These results, analysing individual differences between staff in the three units,

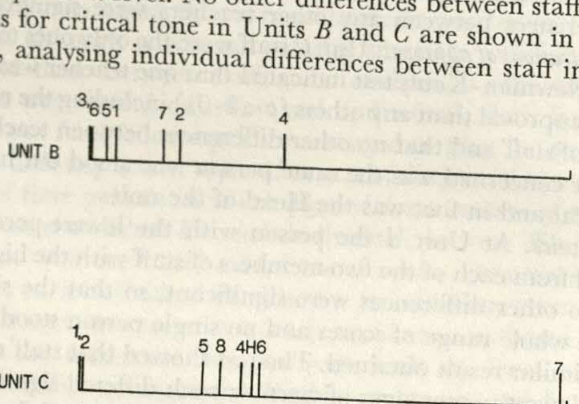

FIG. 4. Staff differences in use of critical tone of voice (1971).

show that Unit *C* was not the same as the other two. Although there were a number of differences between individual members of staff at Units *A* and *B*, no single staff member emerged as very different to others in each unit. Moreover, at Unit *C* two teachers did emerge as being different. The Head of the Unit differed from all other staff in using all kinds of approval including warm tone of voice and physical demonstration of approval more frequently. One of the other senior teachers similarly differed from all other staff of Unit *C* including the Head by virtue of the high rate of occurrence of critical tone in his verbal responses. It is noteworthy that this teacher's rate of acts of disapproval of all kinds was again the highest of all teachers at Unit *C*. Although the analysis of variance for disapproval yielded a non-significant *F* ratio, this result is in keeping with the striking result for critical tone. It is unlikely that these differences between the Head and this senior teacher were due to differences in the children they taught as both tended to take difficult children.

These findings suggest that children were likely to encounter rather varied teacher behaviour at Unit *C*. The Head took new children when they first joined the school, so that the initial teacher–child interaction experienced by school entrants was fairly uniform in style. However, after that, when transferred to other staff, children were likely to receive less warmth and less positive physical contact, and might receive considerably more criticism.

It should be emphasised that the measures apply strictly to warmth and criticism as *demonstrated* so that no conclusions are possible about any teacher's *feelings* of warmth. What was assessed was the professional style of teacher–child interaction rather than any aspect of teacher personality, concerning which we have no data.

It should be remembered that it was not possible to compare the Heads of Units *A* and *B* with other staff as, unlike the Head of Unit C, they did not take an active role in regular teaching.

These findings have important implications, not only for children's experience in Unit *C* but also with regard to staff communication. In so far as the Head wished the staff to treat the children in a similar fashion, there seems to have been some failure to communicate some aspects of what they should do. There was a lack of uniformity in the staff use of warmth and physical contact with the child, in spite of a reasonable consistency in the way staff praised approved behaviour and criticised deviant behaviour. It is noteworthy that as the teacher who stood out as different from both the Head and other staff was senior, the senior staff provided rather conflicting models for new teachers.

Residential staff

A small number of children were resident at Unit *B* (often throughout weekends) and a considerable minority of the children at Unit *C* were weekly boarders. Accordingly, a study was made of the sort of régime provided in these units after school hours.

The boarding arrangements at Unit *B* appeared less than satisfactory. The head of the unit was dissatisfied with the situation, tried to modify it, and towards the end of the study the residential side of the unit was closed. Teaching materials were usually locked in cupboards after school hours and there were few things made available by the staff for the children to play with. It was possible to use the available equipment (radio, TV, 4–5 dolls, 2 books, 1 jig-saw puzzle, balls and skittle game) to stimulate the children during a weekend but the residential staff were state enrolled nurses supplied by the subnormality hospital who had little specialised knowledge of autism.

At Unit *C*, the physical set-up was far more satisfactory. Children were accommodated in flats each with a Home-Office-trained house mother. There were plenty of toys, puzzles and games for children to use and there were all the usual domestic facilities. The children shared a living room with the house-mother who lived and ate with the children.

Staff–child interaction in the boarding departments of Units *B* and *C* was studied using the same time-sampling techniques as those used with day staff. At Unit *C* the boarding staff interacted much less with the children than did the day staff but their style of interaction was similar. In 38 per cent of the observations there was no interaction with children, whereas for day staff the figure was only 4 per cent. ($\chi^2 = 109 \cdot 79$, 1 *d.f.*; $p < 0 \cdot 001$). As with the day staff, warmth and physical contact with the children were rarely used but, in general, the staff approved acceptable behaviour by the child and expressed disapproval of deviant behaviour.

At Unit *B*, there were marked differences between the nurses who cared for the children outside school hours and the teachers. The nurses more often showed approval in response to children's deviant behaviour (22 per cent as against 8 per cent for the teachers) ($\chi^2 = 7 \cdot 64$; 1 *d.f.*; $p < 0 \cdot 01$), and more often gave non-verbal kinds of approval such as physical contact, facial expressions or gestures (54 per cent of acts of approval were shown by either hugging or smiling and the like compared with 16 per cent for teachers) ($\chi^2 = 32 \cdot 89$; 1 *d.f.*; $p < 0 \cdot 001$).

Changes over time in teacher behaviour

Teacher behaviour was systematically observed in the middle of the study in 1969 and again just before the final follow-up of children in 1971. The findings were similar on the two occasions and, in particular, the differences between units remained the same. However, there were a few changes requiring mention. At Unit *A* more of the children's time was spent with the teacher at the end of the study than was the case earlier, and the other staff had become somewhat more directive. For example, there were 89 acts of instruction per 100 units time compared with 51 per 100 units time earlier in the study ($\chi^2 = 10 \cdot 53$; 1 *d.f.*; $p < 0 \cdot 002$). Even so, this is still appreciably below the rates for Units *B* and *C* at any time in the study. At Unit *B*, there was some tendency at the beginning for critical remarks to be said warmly but this was not so at the end. The third change concerns the frequency of physical expressions of approval. Although the relative difference between the units was the same throughout the study, there was a drop in the absolute level of physical approval at the end of the study. As noted above, the explanation probably lies in the age of the children.

Child–Child interaction

As a special point was made in Unit *B* concerning the mixing of autistic children with children showing other problems, the interaction of autistic and non-autistic children at this unit was specifically studied. Three hundred and sixty 15-sec observations were made during free play periods and in only 5 of these observations was any interaction observed between autistic and non-autistic children. All five involved some kind of positive interaction and no hostile or negative interchanges were seen during the systematic observations. The non-autistic children at Unit *B* usually played together in one area while the autistic children were usually engaged in solitary activities elsewhere. These results are in keeping with the finding (Rutter and Bartak, 1973) that there is little interaction between autistic children. It seems that there is also little interaction with other non-autistic children.

5. CONCLUSIONS

It has been found possible to objectively evaluate staff–child interaction. The specific components of staff behaviour that are most relevant to the effective teaching of autistic children are little known and could not be directly assessed in a non-experimental study such as the present one. However, teaching is an "analysable art" (Bijou, 1969) and the possible effects of different teaching methods may be considered in relation to the children's progress at follow-up (Rutter and Bartak, 1973). Our results on staff–child interaction represent a start in the measurement of the separate components of teaching skills as applied to autistic children. That this is likely to be important is suggested by the evidence that teachers involved in special education may adopt particular approaches to handicapped children which influence their educational progress (Jones, 1966; Guskin and Spicker, 1968).

SUMMARY

Autistic children attending three different special units were followed up over a 3½–4 yr period to assess changes in educational, cognitive, linguistic, social and behavioural status. The régimes in the units varied in the amount of structure and the orientation to educational goals. This paper presents details of the study design, methods used, and results of an objective examination of staff behaviour in the three units. It was possible to demonstrate significant differences in the amount and character of staff interactions with children both between units and between individual staff.

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APPENDIX

Staff behaviour (*time sampling*)

Categories	*Examples*
Nil	
Plays with	Co-operative play with child
Works with	Helps child to set out equipment, prepare materials
Acts of instruction	
Questions	Asks child question about task
Directs	Gives child order
Instructs	Shows how to do something
Acts of approval	
Approval	Tells child he is good
Physical reward	Fondles, hugs child
Privilege	Tells child he can have some reward, e.g. going out to play
Acts of disapproval	
Restrains	Physically restrains child's movements
Physically punishes	Hits child
Disapproval	Tells child he is naughty
Other	Tells child he will lose some benefit, e.g. stay in and work

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USING PARENTS AS CHANGE AGENTS FOR THEIR CHILDREN: A REVIEW

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An area of investigation receiving much attention at present is the training and utilization of parents as change agents for their children. The use of parents in therapeutic roles has resulted from an explicit technology of behavior modification predicated on the analysis and manipulation of environmental contingencies. Several published reports have described the success of parents as modifiers of various child disorders (e.g. Allen and Harris, 1966; O'Leary *et al.*, 1967; Wahler, 1969a, b), while others have delineated educational programs to acquaint parental groups with the principles of effective contingency management (e.g. Ora, 1971; Walder *et al.*, 1967). The success of therapeutic intervention by parents is dependent upon the ability of a backup therapist to produce reliable changes in the behavior of parents toward their children. The advantage of parents as change agents is that they constitute a cheap, continuous treatment resource which is able to augment existing therapeutic manpower capabilities and work conveniently within the home. This approach to child therapy should facilitate the generalization of treatment effects (Goldstein *et al.*, 1966; Gruber, 1971) and enable parents to handle new problems better when and if they arise (Patterson *et al.*, 1969a).

This paper will review the procedures and results of investigators who have assisted parents to change the behavior of their children, either within the home or within a laboratory environment. The paper begins with a description of deviant child behaviors that have been successfully modified by parents using various means of behavioral intervention. Methods of parent training are then discussed. Following this, comments are directed toward procedures used to assess the efficacy of parent therapy programs, with recommendations provided by which to achieve more definitive analyses.

CHILD BEHAVIOR DISORDERS

Antisocial and immature behavior

In one of the first case studies of home treatment by parents, Williams (1959) describes the elimination of a child's repeated bedtime tantrums by instructing the parents to ignore them. When parental attention was no longer forthcoming, tantrum activity extinguished within 2 weeks with no undesirable aftereffects.

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Conversely, Boardman (1962) counseled parents to use several punishment procedures—e.g. spanking, confinement, withholding meals, etc.—in order to suppress multiple misbehaviors of their child. Although the parents use of aversive control reportedly produced quick and desirable results, the success of Boardman's therapy program is surprising inasmuch as few positive reinforcements were dispensed for socially approved activity (Bandura, 1962). A related study is provided by Wolf *et al.* (1964). These investigators trained both parents and hospital attendants in the use of extinction, shaping, and timeout operations to reduce various annoying behaviors of a 3-year-old autistic child (e.g. throwing eye glasses that were needed to correct a serious visual defect, tantrums, and food stealing).

Holland (1969) describes the successful treatment of a 7-year-old fire setter who was never seen by the therapist. In this home treatment program parents used a response cost procedure (e.g. contingently confiscating the child's baseball glove) to inhibit firesetting, together with rewards for returning intentionally misplaced matches without striking them. Subsequently, the parents reduced the scheduling of reinforcements with no reoccurrence of the problem behavior. Holland indicates that some generalization of training may have occurred since the parents reported success in dealing with other deviant behaviors of their child as well.

Speech dysfunction

Both Hewett (1965) and Risley and Wolf (1968) used fading and reinforcement operations to accelerate functional verbal behavior in speech deficient children. Once appropriate speech was under stimulus control, the children's mothers who had observed training sessions in the laboratory were able to continue speech training at home. In the Risley and Wolf study as well as in other reports (e.g. Bernal *et al.*, 1968; O'Leary *et al.*, 1967; Wetzel *et al.*, 1966) parents used a timeout contingency to reduce various nuisance behaviors including tantrums and physical aggression. Mathis (1971) utilized a mother as therapist for her 8-year-old illiterate son to greatly increase his social and academic skills. Mathis' study, conducted entirely within the home with minimal supervision by the backup investigator, provides a useful description of several steps that were needed to shape the mother's behavior so that she could more effectively modify the behavior of her son.

School phobia

Patterson (1966) and Tahmisian and McReynolds (1971) used fading and behavior shaping to successfully treat school phobic children. In the Patterson study, for example, the child subject was first reinforced with candy during several sessions of structured doll play. Concurrently, the child's parents were instructed to reward independent behavior at home. Soon the child was attending school accompanied by a special teacher. In subsequent sessions the special teacher was removed for progressively longer periods until the child was in school by himself on a full time basis. A revealing addition to Patterson's report was a pre- and post-test measure of the child's response to social reinforcement. Only in the latter stages of treatment could the experimenter alter the child's response preference in a marble dropping procedure by differentially praising selected responses, a finding which indicates that socially mediated events were exerting greater control over the child's behavior.

Encopresis and enuresis

Conger (1970) hypothesized that maternal attention (e.g. changing soiled clothing, washing rituals, etc.) was instrumental in maintaining the soiling of a 9-year-old encopretic boy. Previously, several pediatric examinations had failed to uncover any physiological reason for encopresis. Treatment consisted of instructing the child's mother to ignore her son following incidents of soiling, while requiring the child to clean himself. The result of this procedure was to dramatically reduce soiling from a baseline level of from 1 to 4 accidents daily to 0 accidents after the first day of treatment. A three month follow-up revealed only one reoccurrence of soiling. In related studies, both Barrett (1969) and Edelman (1971) counseled parents in the use of contingent rewards and mild punishment (e.g. social isolation) to eliminate chronic encopresis in their children, while Tough *et al.* (1971) had two mothers administer a delayed adversive consequence to quickly reduce the occurrence of their children's nocturnal enuresis. In this study an electronic signalling device alerted mothers to bedwetting, following which they immediately awoke their children and gave them a cold bath. The efficacy of this punishment procedure is somewhat equivocal in that enuresis reoccurred in one subject whose mother terminated treatment prematurely. Subsequently, an attempt to eliminate bedwetting by means of the bath contingency proved unsuccessful.

Lovibond (1964) treated 36 enuretic children in groups of 12 to assess the relative success of the Mowrer (Mowrer and Mowrer, 1938) Crosby (Crosby, 1950) and Twin Signal (Lovibond, 1964) bedwetting devices. Parents served as data collectors and treatment continued until a criterion of 14 consecutive dry nights was attained. Of the three, the Twin Signal device was most effective, while the Mowrer device was least effective. However, a 3-year follow-up revealed 14 relapses equally divided among the three groups. Madsen (1966) advised parents who were experiencing difficulty in toilet training their 19-month-old daughter to reinforce her with candy immediately following instances of successful elimination. Although baseline data were not recorded, within 4 days the child was verbalizing requests for the toilet, and within 60 days she was using the bathroom on her own.

By way of contrast to the above studies, Lal and Lindsley (1968) treated a young child with a history of constipation. Parental consequences such as cajoling or caressing the child appeared to be reinforcing his failure to eliminate. During the 13 days of baseline observation, the only time a bowel movement occurred was subsequent to the use of a suppository. Treatment consisted of informing the child that he could play in the bathtub with his toys as soon as he was able to pass a stool. Meanwhile, the mother was instructed to leave the bathroom and close the door. When the child indicated that he had eliminated, the mother promptly returned, checked for feces (he never called without eliminating), showed her approval, and placed the child in the tub. Within 2 weeks, time spent on the toilet decreased from 2 hr to 15 min at which time the child was actively requesting to use the toilet by himself.

Seizures

Gardner (1967) describes the treatment of a 10-year-old girl who experienced somatic pains and convulsions for which there was no determinable medical basis.

A retrospective baseline was obtained by requesting the parents to estimate the past frequency of behaviors selected for modification, including seizures, somatic complaints, and tantrum activity. Next, the parents were told to ignore these behaviors when they occurred, while concurrently reinforcing other appropriate responses. Subsequently the parents reported that seizures were completely eliminated and the incidence of both tantrums and complaints was sharply reduced. Six months later the contingencies were temporarily reversed with a resulting increase in all deviant behaviors. Reinstating the contingencies again brought the behaviors under control. More recently, Zlutnick (1972) instructed parents and school staff to use a two-component punishment procedure to successfully control the minor motor seizures of four children. Seizure activity was conceptualized as a terminal link in a response chain; consequently intervention was aimed at identifying and modifying earlier links in the chain. Punishment, which consisted of shouting "No" and shaking the child once, was applied contingently to selected behaviors that reliably occurred prior to seizures. For each child the rate of seizures was reduced from 42 to 100 per cent below baseline level, although in one case the effects of punishment were transitory.

Self-injurious behavior

Allen and Harris (1966) used a mother as therapist to control the self-injurious scratching of her 5-year-old daughter. The mother was trained to record incidents of scratching and subsequently to reward periods of not scratching with praise and tokens that could be refunded for such items as Barbie Doll clothes. She was told to ignore scratching when it occurred. Seven weeks after the inception of this program, the child's scratching was all but eliminated. In a related study Risley (1968) examined the efficacy of multiple treatments—extinction, differential reinforcement of incompatible behavior, and shock punishment—to eliminate the dangerous climbing of a young brain damaged child. Of the three procedures, only punishment effectively controlled climbing, first in the laboratory and then within the home environment. No undesirable side effects were associated with the use of shock punishment, although punishment effects were reversible and specific to the situation in which punishment was administered.

Oppositional behavior

Hawkins *et al.* (1966) successfully treated a 4-year-old boy who displayed both tantrums and other disobedient behavior. Conducting observations in the home, they used various gestural signals to indicate to the boy's mother when she should timeout, reinforce, or tell him to stop his ongoing behavior. Although a contingency reversal was not performed, the investigators showed a significant correlation between the mother's attention to objectionable behavior and the rate of occurrence of that behavior. Similarly Engeln *et al.* (1968) observed a parent interacting with her deviant child and then intervened by directing her in ways to differentially reinforce behavior incompatible with both noncompliance and tantrum activity. In a recent report, Stuart (1971) instructed parents in the use of behavioral contracting procedures to strengthen cooperative behavior and maintain curfew in their 16-year-old delinquent daughter. Although quantifiable results were not reported, Stuart's use of contracting appears promising. Johnson (1971) trained parents to use extinction, punishment, and fading operations to decrease their children's disruptive activity at the dinner table, as well as to alter their food preference so that larger portions of the prepared meal were consumed.

Zeilberger *et al.* (1968) adopted tactics similar to those of Hawkins *et al.* (1966) to examine the effectiveness of timeout, extinction, and differential reinforcement in reducing a child's aggressive behavior as well as accelerating his capacity to follow instructions. Treatment was conducted at home with the mother as therapist. A reversal design was used to demonstrate functional control over the child's behavior. Similarly, both Wagner and Ora (1970) and Wahler (1969a, b) used reversal techniques in their experiments with parents of oppositional children. In the Wagner and Ora study parents were told to attend to their children only after they had complied with parental instructions. If instructions were not carried out, they were to ignore their children completely. The result of this procedure was to decrease the level of oppositional activity and increase cooperation in 5 of the 7 children selected for observation. In each case, oppositional behavior reappeared during the reversal phase and decreased when differential attention for cooperation was reinstated. Although Wagner and Ora's research was conducted in the laboratory, most of the parents reported improvement in their children's home behavior as well.

Conversely, Herbert *et al.* (1972) found that parental use of differential attention procedures may adversely affect children's behavior. Based upon data obtained in two independent parent training programs which involved six mother–child dyads, their results showed that 4 of the 6 children increased their rate of deviant behavior when mothers selectively attended to appropriate activity, 1 child showed no change under this condition, and 1 child showed a temporary improvement before getting worse. The inverse relationship between deviancy and the occurrence of maternal attention was maintained over several sessions and replicated using reversal techniques. Several tentative explanations were provided by the investigators to account for their unexpected findings including: (1) the effects of intermittent attention for deviant activity; (2) the effects of a reduction in the absolute level of maternal attention; (3) the discriminative function of withholding attention; and (4) response rate increases associated with extinction phenomena. The results of Herbert *et al.* are especially intriguing because both their parent training procedures and child subjects were similar to those of other investigators who report far more impressive treatment outcomes (e.g. Wagner and Ora, 1970; Wahler, 1969a, b). On the other hand, these results underscore the importance of thoroughly assessing the impact of parent behavior modification programs.

METHODS OF PARENT TRAINING

In reviewing methods of parent training, it is instructive not only to discuss training procedures *per se* but also to indicate where descriptive deficiencies exist. For purposes of accurate information transfer, experimental replication, and inter-experiment comparisons, a clear description of critical training operations is needed. However, in many of the studies reviewed, these operations received little emphasis and were insufficiently described to permit replication by others. Parameters such as the number and duration of training sessions were rarely mentioned, and only brief and non-specific reference was made to other manipulations including the scheduling of reinforcements, the use of stimulus control variables, ways to maintain parents' reinforcing behavior, fading control of children's behavior from tangible to social reinforcers, and techniques used to instruct parents in gathering reliable data. These are important components of an experimental analysis of behavior that were frequently neglected.

Didactic instruction with individual parents

A common method of training was to instruct parents in behavior principles and allow them to implement therapeutic programs for their children. Barrett (1969), for example, explained basic principles of learning but the parent subjects were mainly responsible for deciding which behaviors to record and developing appropriate treatment plans. Didactic instruction was also used in a number of other cases (e.g. Boardman, 1962; Conger, 1970; Holland, 1969; Lal and Lindsley, 1968; Madsen, 1965) in which there was little or no contact with the deviant child and training consisted of individual counselling sessions with parents. Johnson (1971) relied primarily on instruction but introduced role-playing and video tape feedback into the training process.

Group training

Other investigators have employed group sessions to train parents as behavior modifiers. Salzinger *et al.* (1970) for example, used both individual and group training operations. The group training approach focused on behavioral observation and recording. Groups met bi-weekly for a series of lectures on the functional analysis of behavior and to discuss material presented in a prescribed textbook. All parents were instructed to read the text and to answer questions in it. Following this, they were tested on the material, and retested on the same material 3 months later. Additionally, group discussions dealt with specific problems the parents were having in implementing change programs, with both participating parents and the experimenters contributing advice. Salzinger *et al.* report positive relationships between educational level of the parents and success in the project, as well as between test-retest scores and successful therapeutic manipulations. These data suggest that for some parents with poor educational backgrounds it may be desirable to supplement abstract instructional material with either direct reinforcement to increase parent motivation, or various modelling procedures (e.g. live modelling, behavioral rehersals with video taped feedback, or filmed vignettes of models exhibiting both adaptive and maladaptive responses to common problem situations) that can be used to teach through demonstration.

Walder *et al.* (1967) have described a comprehensive training program designed to teach general principles of learning and to assist parents in performing a functional analysis of their children's behavior. The program involved four major steps arranged sequentially. Parents were first taught to accurately observe behavior and record data; next they learned to identify contingencies that control behavior; this was followed by *in vivo* shaping projects using both other parents and laboratory animals as subjects; finally, a review was conducted to discover how parents were applying principles of behavior control within the home. In order to exert control over parent behavior, Walder *et al.* required that weekly homework assignments be completed prior to admission to group training sessions. Opportunity to receive individual consultation was contingent upon increasingly higher levels of accomplishment by parent subjects, while a negative consequence—forfeiture of a previously deposited sum of money to an idealogically unattractive group—was also used to enhance and maintain parent involvement.

Peine and Munro (1970) compared the efficacy of a parent training group operating under a token reinforcement system (tokens were exchangeable for small sums of money) with a traditional lecture-demonstration group. They found the former to perform better on measures of attendance, punctuality, and completed written assignments. Greater participation and responsiveness were also reported in the token reward group although objective data on these behaviors were not collected. Similarly, Mira (1970) used contingency management with her parent subjects. To obtain an individual appointment with a staff advisor, parents were required to have a one week record of observations on behaviors selected for modification. If parents missed three appointments before effecting any change in their child's behavior, they were dropped from the program. Since parent training was available without cost, these contingencies were presumably necessary to increase parental motivation and enhance their investment in behavioral change. Lindsley's (1970) results provide some support for this contention. Of the 14 parents he attempted to train, only 9 were successful graduates of the program.

Patterson *et al.* (1969b) used a group training procedure similar to Salzinger *et al.* (1970). Parents were first required to read a self-instructional text (Patterson and Gullion, 1968) covering principles of social learning theory. In individual meetings held prior to group training they were simultaneously taught to pinpoint problems, as well as record and graph behavior. Baseline data on problem behaviors were then required for admission to group training at which time specific intervention programs were designed. Reportedly, parents were able to produce an average reduction of from 40 to 50 per cent in their children's deviant behavior over baseline level as a result of this training regimen. However, appropriate control groups were not included in the program.

Although group training has the built-in advantage of enabling professionals to deal with several parents simultaneously, it is possible that individual training allows for concentrated instruction on focused objectives which may be conducive to higher levels of competency and skill development. With the exception of Mira (1970) who found individual training to be less expensive and more efficient than training in groups, group versus individual training has not been systematically examined and thus constitutes an important area for subsequent research.

Laboratory training

A number of therapists have brought parents and child into the laboratory for training purposes. In many cases (e.g. Engeln *et al.*, 1968; Hewett, 1965; Wagner and Ora, 1970) the investigator first modelled appropriate ways to interact with the child after which parents would imitate these techniques. A report by Johnson and Brown (1969) is especially noteworthy in that it constitutes one of the few attempts to evaluate the relative efficacy of multiple training procedures including modelling, direct instructions, group discussion, and behavioral direction via a signalling device. Of these procedures, they found modelling by the therapist to be most effective in producing rapid change in parent behavior. The data were by no means conclusive, however. Several other investigators (e.g. Bernal *et al.*, 1968; Wagner and Ora, 1970; Wahler, 1967) have used modelling and cueing via lights, hand signals or remote controlled auditory devices to provide ongoing feedback to parents and to otherwise direct their behavior. Cueing of this kind may function as a reinforcing event and it would therefore appear to be useful in the shaping of parent's behavior (Johnson and Brown, 1969; Toepfer, 1972).

A recent project (Ora, 1971; Wagner and Ora, 1970) is based upon the use of experienced parents as trainers for novice parents in a laboratory setting. The contention of staff involved in the Regional Intervention Project (RIP) is that parents who have successfully handled similar problems with their children can provide support and reassurance to anxious mothers as they enter the program. Consequently, RIP is gradually fading out the use of professional staff and placing greater reliance on printed materials, video tapes, and parent-to-parent consultation. The training of new parents is a project obligation and the final phase of the program for graduating parents. Preliminary reports on the project appear promising.

Combined home and laboratory training

Some investigators have brought parents into the clinic for training and followed this with visits to the home for further consultation. Cantrell *et al.* (1969) interviewed parents and teachers in the laboratory not only to isolate problem behaviors but also to determine controlling contingencies and discover possible reinforcers that might be used therapeutically. The authors then prepared written contracts outlining remediative changes in reinforcement contingencies for behaviors incompatible with the referral problem. Similar use of behavioral contracting has been described by Stuart (1971), and Tharp and Wetzel (1969).

Patterson *et al.* (1967) developed a behavioral program in the laboratory to increase the social responsiveness of a young child. Control was soon shifted to the mother using a fading technique. During the home treatment phase, the mother prepared notes describing both the adaptive behaviors of her child and the social reinforcers she was using to strengthen them. For each note received the experimenters deducted $1.00 from their fee schedule.

More recently, Patterson *et al.* (1969a) have presented a series of pilot studies of 6 male children using a standardized training procedure for their families. Parent–child interactions were first observed within a laboratory setting, after which the parents were instructed in social learning theory and trained to observe and count their child's behavior. The entire family then participated in sample intervention programs modelled by the investigators and then imitated by family members. The purpose of these sample programs was to increase reinforcement for desirable behaviors while concurrently reducing reinforcement for deviant activity. Subsequently, specific behavioral programs for referral problems were implemented using frequent practice sessions with the experimenters to sharpen techniques of differentially dispensing reinforcers. Observations made during baseline, intervention, and follow-up periods revealed a significant reduction in disruptive behavior at the completion of treatment.

Home training, or a combination of home and laboratory training, allows the experimenter to examine directly the frequency and magnitude of troublesome behaviors. As noted by Patterson *et al.* (1969a) it is entirely possible that parental reports of their child's behavior may be grossly exaggerated; indeed, upon observation the identified problem child may show less deviant behavior than his normal siblings. A standardized interview form such as the one described by Holland (1970) might be used to increase the accuracy of parental complaints and observations. Holland's form requires parents to first pinpoint disruptive behaviors and then specify prevailing contingencies, procedures for change, and potential reinforcers in a 21 step sequence.

The use of contingencies for parents undergoing training is worthy of additional comment. It is generally assumed that parents are highly motivated to receive training inasmuch as they are the ones most directly affected (or punished) by their children's disruptive activity. However, many therapists have found it worthwhile to utilize extrinsic reinforcers such as fee reductions (Mira, 1970; Patterson *et al.*, 1967), individual consultation (Walder *et al.*, 1967), group praise (Johnson and Brown, 1969), experimenter praise (Toepfer, 1972), and monetary rewards (Peine and Munro, 1970) in order to insure active parent participation. Other events including trips to the hairdresser, driving lessons, and steak dinners have been used by Patterson and his associates (Patterson *et al.*, 1969a; Patterson *et al.*, 1969b) to encourage parents working to change their children's disruptive activity as well as to maintain newly acquired management skills. These material rewards may be especially helpful in one parent families where the sole parent has no spouse to reinforce his or her performance. As with the modality of parent training, the role and scheduling of external rewards in modifying parent behavior is in need of further investigation.

The use of programmed texts on operant techniques was mentioned in several studies (e.g. Patterson *et al.*, 1967; Patterson *et al.*, 1969a; Salzinger *et al.*, 1970) although their contribution in parent training has not been thoroughly assessed. Conceivably, texts such as those by Patterson (1971), Patterson and Guillon (1968) and others (Becker, 1971; Deibert and Harmon, 1970; Madsen and Madsen, 1972; McIntire, 1970; Zifferblatt, 1970) may sharpen parent's cognitive understanding of reinforcement principles and in this way assist them in acquiring general strategies of intervention which can be applied to alter or prevent subsequent behavior disorders.

EVALUATION OF TREATMENT OUTCOME AND SOME METHODOLOGICAL CONSIDERATIONS

Table 1 summarizes various methodological characteristics of the studies reviewed. For each study, information is provided concerning the number of subjects treated, the adequacy of the description of parent training procedures, the type of training techniques used, whether or not reliability figures for dependent variables were cited, demonstrations of behavioral control performed, and follow-up conducted. Cost efficiency data are also indicated where provided by the experimenter. Generally speaking, these studies can be dichotomized into two groups: case studies

TABLE 1. METHODOLOGICAL CHARACTERISTICS OF STUDIES USING PARENTS AS THERAPISTS FOR THEIR CHILDREN

Study	No. of *S*s	Adequacy of description of parent training operations	Primary training techniques	Provision of reliability estimate	Demonstration of behavioral control	Follow-up	Estimate of therapist's time investment
Allen and Harris (1966)	1	Clear	Modelling and instructions	No	No	4 months	No
Barrett (1969)	1	Vague	Instructions	No	No	2 months	No
Bernal *et al.* (1962)	1	Clear	Instructions and video tapes	Yes	No	No	No
Boardman (1962)	1	Vague	Instructions	No	No	No	No
Cantrell *et al.* (1969)	?	Clear	Instructions, contingency contracts	No	No	Yes	No
Conger (1970)	1	Vague	Instructions	No	No	3 months	No
Edelman (1971)	1	Vague	Instructions	No	No	3 months	Reported as less time consuming
Engeln *et al.* (1968)	2	Clear	Instructions, modelling	No	No	5 months	No
Gardner (1967)	1	Vague	Instructions	No	Yes	1 yr	No
Hawkins *et al.* (1966)	1	Clear	Instructions, cueing	Yes	Yes	24 days	No
Herbert and Baer (1972)	2	Clear	Counting attention to behavior	Yes	Yes	2 months	10 min
Herbert *et al.* (1972)	6	Clear	Instructions, cueing	Yes	Yes	No	No
Hewett (1965)	1	Vague	Modelling and instructions	No	No	No	No
Holland (1969)	1	Vague	Modelling and group discussion	No	No	8 months	No
Johnson (1971)	2	Vague	Instructions, rehearsals w/video tape feedback	No	No	No	No
Johnson and Brown (1969)	2	Clear	Instructions, modelling, cueing, group praise	No	Yes	No	No

Lal and Lindsley (1968)	1	Vague	Instructions	No	No	8 months	No
Lindsley (1970)	14	Clear	Group discussion, recording behavioral frequencies	No	No	No	No
Lovibond (1964)	36	Vague	Bedwetting devices and instructions	No	No	3 yr	No
Madsen (1965)	1	Clear	Instructions	No	No	6 months	No
Mathis (1971)	1	Clear	Instructions, text	No	No	No	No
Mira (1970)	82	Clear	Individual and group discussion, reinforcement	No	No	No	3 hr in group; 2·1 hr in individual professional time
O'Leary *et al.* (1967)	2	Vague	Discussion, cueing and shaping	Yes	Yes	No	No
Patterson (1966)	1	Vague	Instructions and modelling	No	Pre- and post-test for effectiveness of social reinforcement	3 months	No
Patterson (1968)	2	Clear	Text and discussion	No	No	2 weeks	5–6 hr
Patterson and Brodsky (1966)	1	Clear	Modelling and instructions	Yes	No	Yes	No
Patterson *et al.* (1967)	1	Clear	Text, modelling, instructions, reinforcement	Yes	Yes	1 yr	6 hr
Patterson *et al.* (1969a)	6	Clear	Text, modelling, practice and instructions	Yes	No	6 and 12 months	9·8–46·7 hr
Patterson *et al.* (1969b)	1	Clear	Text, instructions, modelling and reinforcement	No	No	Planned	1 case of 150 min
Risley (1968)	1	Clear	Instructions, modelling	Yes	Yes	No	No
Risley and Wolf (1966)	1	Clear	Modelling and instructions	No	No	No	No

TABLE 1 (*Continued*). METHODOLOGICAL CHARACTERISTICS OF STUDIES USING PARENTS AS THERAPISTS FOR THEIR CHILDREN

Study	No. of *S*s	Adequacy of description of parent training operations	Primary training techniques	Provision of reliability estimate	Demonstration of behavioral control	Follow-up	Estimate of therapist's time investment
Russo (1964)	2	Vague	Modelling and instructions	No	No	No	No
Salzinger *et al.* (1970)	15	Clear	Text, individual and group discussion	No	No	No	No
Stuart (1971)	1	Vague	Instructions	No	No	No	No
Tahmisian and McReynolds (1971)	1	Vague	Instructions	No	No	4 weeks	2 hr
Toepfer (1972)	24	Clear	Instructions, cueing, reinforcement	Yes	No	No	No
Tough *et al.* (1971)	2	Clear	Instructions	No	No	1 yr	No
Wagner and Ora (1970)	7	Clear	Instructions, cueing	Yes	Yes	No	No
Wahler (1967)	1	Clear	Instructions	No	Yes	No	No
Wahler (1969a)	2	Clear	Instructions, discussion and shaping	Yes	Yes	No	No
Wahler (1969b)	2	Clear	Instructions, discussion and shaping	Yes	Yes	No	No
Wetzel *et al.* (1966)	1	Vague	Modelling and instructions	No	Partial	No	No
Wolf *et al.* (1964)	1	Clear	Modelling, instructions and shaping	No	Yes	6 months	No
Zeilberger *et al.* (1968)	1	Clear	Instructions, cueing and shaping	Yes	Yes	No	No
Zlutnick (1972)	4	Clear	Instructions	Yes	Yes	6–8 months	4–6 hr

(e.g. Boardman, 1962; Holland, 1969; Madsen, 1965; Patterson, 1966; Stuart, 1971) which usually constituted narrative accounts of treatment programs with neither quantifiable results nor the requisite experimental control to demonstrate casual relationships, and controlled studies in which investigators (e.g. Herbert *et al.*, 1972; Wagner and Ora, 1970; Wahler, 1969a, b) utilized experimental operations to more accurately assess the influence of their treatment technique. Relying primarily on single-subject designs (Sidman, 1960), many of which closely adhered to the criteria set forth by Gelfand and Hartmann (1968), these latter investigators have enhanced the scientific acceptability of their findings by objectively measuring target behaviors and by systematically manipulating independent variables to examine their functional role in producing behavioral change.

Observational data

At least two series of observations are needed to evaluate treatment effects: one series before treatment is introduced and one after. By comparing these pre- and post-treatment observations, behavioral change that covaries with the introduction and removal of manipulated variables can be readily detected. In the preceding studies, observational data were obtained: (1) by parents who were trained to record their children's behavior in the home (e.g. Allen and Harris, 1966; Conger, 1970; Johnson, 1971); (2) by independent raters who were used primarily to observe parent–child interactions during structured conditioning sessions (e.g. Johnson and Brown, 1969; Wagner and Ora, 1970; Wahler, 1969a, b); and (3) by audio and/or visual recording devices (Bernal *et al.*, 1968; Mathis, 1971).

Notably, some investigators (Wagner and Ora, 1970; Risley, 1968) used both parents and independent raters to determine if modifications produced in the laboratory generalized to the home environment, while others (Boardman, 1962; Engeln *et al.*, 1968) reported few if any objective measurements. Instead, the subjective impressions of parents, teachers, and others constituted the principal data source.

Training parents to define and objectively record their children's behavior, including correlated antecedent and consequent events, may be clinically useful insofar as observational skills are developed which can be used to assess continuing behavioral programs after intervention by professional personnel has ceased. Both Patterson and Guillion (1968) and Bijou *et al.* (1968) have described procedures that may be used by parents to observe their children's behavior in the home. Additionally there is evidence to indicate that measurements performed by parents may acquire a discriminative control function to facilitate positively reinforcing contacts between parents and their children (Herbert and Baer, 1972).

However, if rigorous demonstrations of behavioral control are of prime importance to the investigator, then carefully trained raters who are unaware of the purpose of the experiment are certainly to be recommended (Bijou *et al.*, 1968; Rosenthal, 1963). Under conditions in which raters are conspicuously present—e.g. when observations are conducted in the home or in a laboratory without the use of a one-way mirror—it may be desirable to assess the reactive effect of these raters by comparing rates of target behaviors both within and outside of the rater's presence. Previous assessments of this kind have shown that "being observed" constitutes a stimulus for behavioral change (Patterson and Harris, 1968) and a similar assessment would probably have been appropriate in some of the studies previously reviewed (Herbert *et al.*, 1972; Wahler, 1969a, b; Zeilberger *et al.*, 1968).

Just as different means of data procurement were utilized, the way in which behavior sampling was conducted also differed. In home treatment studies the usual procedure was for parents to record either the absolute frequency of target behaviors (Barrett, 1969; Conger, 1970; Tough *et al.*, 1971) or the duration of these behaviors (Johnson, 1971; Lal and Lindsley, 1968; Williams, 1959). Conversely, in studies using raters other than parents it was more common for data to be expressed as a percentage function of the occurrence or nonoccurrence of target behaviors during specified time intervals, irrespective of behavior frequency (Herbert *et al.*, 1972; Wahler, 1969a, b; Zeilberger *et al.*, 1968). However, there were exceptions in which independent raters counted each incident of behavior rather than use time sampling as a means of detecting behavioral change (Johnson and Brown, 1969; Risley, 1968; Wolf *et al.*, 1964). Whether event sampling and time sampling provide comparable estimates of the effectiveness of similar treatments will depend upon several factors, including the actual rate of target behaviors and the duration of the interval in which the occurrence or nonoccurrence is recorded. Clearly, to allow for accurate inter-experiment comparisons of treatment outcome, investigators should select a recording scheme that will insure close correspondence between recorded and actual rates of behavior.

Reliability of measurement

An inspection of Table 1 indicates that the dependent measures of many investigators were not accompanied by empirically derived estimates of their reliability, a deficit which impedes inferences regarding the efficacy of treatment since there is no way to determine the extent to which one is dealing with error. However, reliability figures based on the percentage of agreement between two or more raters conducting observations simultaneously were cited in the reports of Bernal *et al.* (1968), Hawkins *et al.* (1966) Herbert *et al.* (1972), and many others. Herbert and Baer (1972) found that raters had high agreement among themselves but their agreement with parents who had been requested to monitor their own behavior ranged from 20 to 74 per cent and did not improve over time. These and other findings (Haggard, Breckstad and Skard, 1960) suggest the importance of providing some estimate of the accuracy of parent's observations when they serve as primary data collectors. Otherwise, data that may be subtly distorted to impress the investigator or confirm his expectations will go undetected.

Bijou *et al.* (1968) have discussed the significance of accurately assessing rater reliability. Without clearly specified, objective definitions of behaviors to be modified, in addition to thorough rater training (e.g. to delineate where and how observations are to be made), agreement between or within raters across time will probably be less than satisfactory. Conversely, it is important that investigators insure the independence of raters observing simultaneously (e.g. by partitions or physical distance; see Wagner and Ora, 1970) so that the incidence of their agreement is not artificially inflated.

Demonstrations of behavioral control

Failure to control for the effects of various extraneous variables cited by Campbell and Stanley (1963) and others (e.g. Goldstein *et al.*, 1966) precludes unambiguous interpretations of the results of approximately 64 per cent of the studies reviewed (Table 1). In these studies, variables such as history, maturation, reactive measurements, or instrument decay were hopelessly confounded with treatment operations. Consequently, it is plausible that these unspecified variables rather than treatment may have been instrumental in producing behavioral change. Investigators who demonstrated that treatment operations exerted functional control over children's behavior usually did so by means of reversal techniques in ABAB experimental designs (Sherman and Baer, 1969).

Although contingency reversals with accompanying shifts in performance can convincingly demonstrate behavioral control in research with single subjects (Sidman, 1960), the results of Herbert *et al.* (1972) indicate the hazards of generalizing the efficacy of treatment based upon evidence obtained from limited samples to other subjects with similar problem behaviors.

In clinical research with children it may be difficult to secure parental consent to temporarily reverse treatment procedures, if not altogether undesirable to renew previously troublesome behaviors (e.g. self-injurous activity, fire setting, stealing, etc.). Where practical or ethical exingencies preclude reversals, one or more of the manipulations suggested by Gelfand and Hartmann (1968) may be used to demonstrate behavioral control. These manipulations include the use of: (1) yoked controls; (2) independently manipulating sub-units of target behaviors; (3) performing contingency changes that have reliable effects on response rate (e.g. altering reinforcement schedules); and (4) reversing contingencies for limited aspects of target behaviors under limited stimulus conditions. Another alternative control procedure is the use of multiple baseline designs. Although rarely encountered in applied research, Hall *et al.* (1970) have recently described the utility of this tactic to demonstrate functional control across behaviors, situations, and subjects.

The consecutive introduction of multiple treatments with no return to baseline presents an additional design problem which, because of possible cumulative or order effects, renders it impossible to assess the influence of individual treatments alone (Campbell and Stanley, 1963). Methodological problems of this type were occasionally in evidence (e.g. Risely, 1968; Wahler, 1967).

Follow-up

Follow-up observations made after formal intervention has ceased are advantageous for several reasons: (1) to assess the durability of treatment effects; (2) to insure that adaptive child behaviors continue to be positively reinforced; and (3) to provide parents with continued assistance should new problems develop, or conversely, approval and encouragement for their ability to effectively control previously objectionable behaviors. Follow-ups in the studies reviewed (Table 1) ranged from a period of 3 years (Lovibond, 1964) to 2 weeks (Patterson *et al.*, 1967). Usually, however, these post-treatment assessments were conducted infrequently, informally, and indirectly, either by telephone, a letter, or a brief in person visit with the backup investigator. With the exception of Hawkins *et al.* (1966), Herbert and Baer (1972) and others (e.g. Patterson *et al.*, 1969a) it was uncommon for investigators to return to the home to obtain follow-up measurements directly.

When performed, follow-ups almost invariably indicated that behavioral improvements were maintained beyond baseline level with no undesirable aftereffects. Nevertheless, the impressiveness of these results might well have been enhanced had more investigators conducted repeated follow-up probes using observation methods similar to those employed during treatment. Only in this way is there any assurance that behaviors assessed at follow-up and during treatment are one and the same (McNamara and MacDonough, 1972).

Cost factors

The cost of implementing parent administered behavior modification programs in terms of both professional time expenditure and reinforcements utilized has been largely ignored. However, these factors should be considered in view of the limited number of professionals available for consultation, as well as the limited ability of some parents to afford professional assistance.

Both Tharp and Wetzel (1969) and Madsen and Madsen (1972) have prepared useful guidelines by which to select reinforcing events for children. Importantly, most of these potential reinforcers are relatively inexpensive and may be easily controlled by parents. Among those listed are socially mediated events such as parental praise and approval, recreational activities (e.g. movies, shopping trips, T.V. time, pool hall time, etc.) which may be used according to Premack's probability of behavior rule, and material objects, including candy, toys, money, etc.

Only a few investigators have provided information regarding total time expenditure by professional personnel. For Patterson and his associates 150 min were invested in one study (Patterson *et al.*, 1969b), 5–6 hr in another (Patterson, 1968; Patterson *et al.*, 1967), and from 9·8 to 46·7 hr in other studies (Patterson *et al.*, 1969a). This unusually high investment of nearly 47 hr resulted because of difficulties involved in retraining a father to use more positive reinforcement and less aversive control in dealing with other members of his family. Mira (1970) reports that an average of 3·9 hr of professional time were expended to train parents in group sessions to successfully modify their children's behavior. Conversely, when training was conducted individually an average of 2·1 hr were needed. For Zlutnick (1972) less than 6 hr were required for training, while for Tahmisian and McReynolds (1971) approximately 2 hr of professional time were spent. Of this, 90 min were devoted to instructing parents in operant principles as well as developing modification programs, while the remaining 30 min were spent in follow-up telephone calls. Wahler and Erickson (1969) used volunteers as behavioral counsellors to assist parents in administering therapy programs in the home. The utilization of these volunteers in addition to the regular professional staff resulted in doubling the number of cases handled and halving the amount of time required for treatment. Finally, Herbert and Baer (1972) spent only 10 min to instruct 2 mothers (who had some previous experience with behavior modification techniques) in the use of wrist counters to monitor their own behavior, the result of which was to produce positive changes in both the mothers' behavior and that of their children.

CONCLUDING REMARKS

Evidence from numerous studies indicates that parents can be used effectively to modify their children's disruptive behavior. Nevertheless, additional controlled research is needed not only to identify critical variables in parent training, including a comparative analysis of different training procedures (e.g. lecture, reading assignments, group discussion, modelling, money contracts, training in observation, cueing, teaching principles of behavior change versus teaching how to modify a specific behavior), but also to determine the most efficient and productive means of maintaining adaptive behaviors after formal intervention has ceased. For this, long term follow-ups should be routinely conducted.

Poorly defined independent and dependent variables constituted a serious deficiency in many of the studies reviewed. Inadequate descriptions of what was done by whom to alter which behaviors almost certainly preclude replication by others without which the validity of treatment manipulations cannot be established. In several instances, the effects of intervention by parents could have been less ambiguously interpreted had the backup investigator demonstrated behavioral control using either reversal techniques or multiple baseline designs.

Failure to systematically program generalization of treatment effects (Gruber, 1971) was frequently encountered. Although generalization of training was occasionally reported (e.g. Edelman, 1971; Holland, 1969; Wagner and Ora, 1970; Zlutnick, 1972), Wahler's (1969b) results suggest that behavioral improvement does not necessarily generalize across situations until environmental support is provided to maintain it. Consequently, it may be necessary to involve parents as well as teachers, siblings, and other socializing agents in order to facilitate generalization of training across diverse stimulus settings.

Finally, no mention was made of children who had been trained to perform measurements of their own behavior. This may be a worthwhile procedure to supplement contingency management by parents if only because such training actively involves the child in the modification of his own behavior and it might well produce results similar to those obtained by Herbert and Baer (1972)—an acceleration of desirable behavior merely by recording its frequency of occurrence.

SUMMARY

The results and procedures of investigators who have used parents as primary or auxiliary change agents for their children are reviewed. Deviant child behaviors that have been successfully modified by parents are first described. Following this, methods of parent training are discussed. The third and final section of the paper deals with some critical methodological issues—data collection, reliability of measurement, demonstrations of behavioral control, follow-up, and cost-effectiveness factors—that require routine and more careful consideration before the efficacy of parent therapists can be adequately assessed. Several recommendations are provided by which to achieve more definitive analyses of this approach to child treatment. Suggestions for subsequent research are also briefly discussed.

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ATTACHMENT AND MOTHER–INFANT INTERACTION: SOME RESEARCH IMPASSÉ AND A SUGGESTED CHANGE IN ORIENTATION

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THE TRADITIONAL way of discussing the relationship between Attachment and Mother–Infant Interaction is to view the former as a function of the latter.

Theorists and researchers with an ethological orientation (Bowlby, 1969; Ainsworth, 1969; Schaffer and Emerson, 1964), as well as theorists and researchers employing principles derived from a variety of learning theories (Sears, 1965, 1969; Gewirtz, 1969; Cairns, 1966), all tend to view the development of attachment as a *function* of some aspects of the interaction between mother and infant. Some current work which attempts to relate principles of cognitive development to the development of attachment (Décarie, 1965; Bell, 1970) falls into the same pattern of viewing the development of attachment as a function of mother–infant interaction (*and* cognitive development). Possibly all these different theoretical approaches could be seen as derived from Freud's theory of cathexis and object formation (Freud, 1938; Fenichel, 1945).

The main argument of this paper is that a much more fruitful approach to the study of attachment is to view it as mother–infant interaction instead of a *function* or outcome of such interaction. The fact that most *theoretical* definitions of attachment regard it as an interpersonal interaction system (Bowlby, 1969; Ainsworth, 1969) makes our argument sound redundant or at best semantic in nature. It is not. There seems to be a serious discrepancy between the theoretical definitions of attachment (as interpersonal interaction) and the use of this concept in an empirical context.

It has been pointed out by Cairns (1969) that the study of attachment as it currently appears in the psychological literature involves surprisingly little analysis of dyadic interaction sequences. The place of this analysis is taken up by "summary constructs". Cairns' emphasis is placed on a detailed analysis of the stimulus properties of interpersonal behaviour. He provides some data to support his argument that such an analysis, however laborious and costly, is necessary to the understanding of attachment.

Although Cairns' conclusions are based mostly on animal research, the difficulties found in research on attachment behaviour with humans are not that different in principle; they too result from using attachment, in the empirical context, as a "summary construct". The present writer feels that certain impassés and difficulties in research and theory in this area can be avoided or overcome with a change in orientation. Attachment is not a "thing" resulting from an interaction between

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mother and infant but rather a *characteristic of some patterns of interaction* between mother and infant itself.

Attachment may thus be the likelihood above chance level (or some other probability level) of the occurrence of behaviour i_x when preceded by j_y (when x, y are different individuals or stimuli and i, j different behaviours or aspects of stimuli) in a given set of circumstances t_a. i_x may be the infant's visual scanning preceded by j_y which is the presentation of mother's face when infant lies awake supine in a crib, which is t_a. Similarly, i_y may be the mother's hurried walk into the infant's room when preceded by j_y which is her infant's crying, when the infant is 2 hr after feeding, is awake and alone in his room, which is t_a.

The empirical questions derived from this outlook on attachment vary considerably from those derived from an approach which regards attachment as a characteristic of a certain individual.

The main line of investigation derived from the approach presented here considers the factors determining the conditional probabilities in the attachment interaction and the study of the processes underlying this interaction. Firstly, at the descriptive level what are the identified events of i, j, t in the natural habitat and interactions with x and y? Secondly, what aspects of various behaviour (i, j) of different individuals (x, y) in what set of conditions (t) will have what impact on the probability of occurrence, of say (i_x) given (j_y) and (t_a)? Thirdly, what other aspects of x, y, not directly involved in the behaviour observed in the interaction, may modify the conditional probability under investigation (e.g. aspects of x's cognitive development, or specific previous experience of y in encounter with individuals similar to x)? Previous mother–infant interaction may be one aspect influencing *current* mother–infant interaction, and thus may have an effect on some characteristics of the interactions that may be called attachment. Contrary to the traditional approach which regards attachment as an individual's characteristic or trait, our approach does not deal with questions of "indices" and "stability", these questions become *meaningless* under our conception of attachment.

It is in this domain that several impassés have been reached; impassés that can be avoided when our concept of attachment as an *interaction process* is employed.

ATTACHMENT AND ITS INDICES

One such impassé has been reached in attempts to *define* attachment on an empirical, operational level. If attachment is regarded as a "thing", or is employed as a theoretical concept reflecting an "entity" or a "trait", one must find observeable or behavioural indices for it. When dealing with indices, the obvious problem of choice emerges. Is one index of attachment *better* than another? Does index x correlate with index y? What criteria do we use to choose and evaluate their validity? It has been proposed elsewhere (Rosenthal, 1965) that in order to subsume under one concept two different behavioural categories, as indices, it is required that these two categories should "behave" in a similar fashion in a varied set of conditions. In other words, the two categories should have identical functional relationships with other variables. Rosenthal proposed the criterion of identical functional relationship as a substitute to the use of correlation coefficients between indices. Her argument is that the latter do not yield very adequate information for the decision whether or not to subsume different behaviour categories as indices for one single "summary construct". Her data (Rosenthal, 1967a, b) show that "proximity-seeking" and "attention-seeking" have different functional relationships with setting conditions, such as "provoked-anxiety level" and "novelty". These two behaviour categories are frequently used as indices of dependency and attachment (Maccoby and Masters, 1970; Lewis and Ban, 1971). Can we accept them as equivalent indices (hence interchangeable) of the same construct when they vary differently as a function of another variable which is most relevant to that construct? This is only one example of the difficulties encountered by research that regards attachment as a construct, a trait, or a personality characteristic.

The problems and disagreements concerning indices of attachment have been recently discussed by Gewirtz (1971) and the urgency in overcoming such difficulty for the meaningful advancement of research on attachment is quite obvious.

The change in orientation suggested by the present writer implies that "attachment" has no additional meaning outside certain characteristics of mother–infant interaction (or for that matter, the interaction between any two living organisms). It is not a "trait" or "system" which characterises the personality of one of the partners in the interaction but rather *a characteristic of the interaction itself* (i.e. a given conditional probability for a certain sequence of events).

Some difficulties in employing such a change in orientation may result from the use of the word "attachment" in everyday use, but this would be true for many theoretical concepts and should not hinder us from adopting a different orientation if it proves more useful. Once we stop viewing attachment as a "thing" existing outside the interaction between mother and infant, the question of choice of indices disappears, since there is nothing to be indexed. One studies the lawfulness and patterns of a *process*, not a "thing", and these need no indices. In any case, such indices can only reflect some partial aspect of mother–infant interaction (e.g. "crying when mother leaves" by Schaffer and Emerson (1964); all 13 situations described by Ainsworth (1964); "touching", "looking at", "vocalizing to", "seeking proximity of", as described by Lewis and Ban (1971) and by Coates, Anderson and Hartup (1971); "smiling to approaching caretaker" as used by Ambrose (1961), and Gewirtz (1965)). Unfortunately, most of these studies focused only on single "rings" in the interaction chain. Somewhat more appropriate interaction units, in line with the orientation proposed by the present writer, are those described by Ainsworth *et al.* (1971), where the response of the mother (approach, ignore) to the infant behaviour (cry) is observed as well.

In other words, we are proposing here to investigate the relationship between attachment and mother–infant interaction as a relationship between observations of two (or more) sets of interactions between mother and infant, obtained at two (or more) points of time, where the observations made, say at t_n, are seen as the dependent variable and those made at t_{n-k} as the independent variables. The observations at t_{n-k} can be extended to include interactions between the infant and other persons, animals and objects in his environment. The choice of what aspects of the interaction the researcher prefers to work on, remains then irrelevant to the definition of attachment. The value of his work is, therefore, not judged on the basis of number and adequacy of "indices" (Gewirtz, 1969 and 1971), since according to our argument any aspect of interaction is adequate. Instead it will be judged on the merits of its contribution to the understanding of, (a) the underlying *processes* involved in the interaction (Cairns, 1971; Bowlby, 1969), (b) the relationship between different patterns of interaction across time and across different situations in which interaction takes place, as well as across different persons with whom interaction takes place. In addition, his work will also be judged obviously on its adequacy on methodological grounds (e.g. reliable and replicable data, appropriate definition of interaction unit) (Rosenthal, 1973). With this proposed change of orientation the problems of assessing adequate "indices of attachment", where there is no criterion for adequacy, are no more an issue.

THE STABILITY OF ATTACHMENT

Recent years have seen a renewed and growing interest in the question of the consistency and stability of attachment (Ainsworth *et al.*, 1971; Coates, Anderson and Hartup, 1971; Lewis and Ban, 1971; Maccoby, 1971): How consistent or how stable is the attachment (rating, frequency) of the child, across different points of time in his development? In different interpersonal situations? With the same or different person?

The very phrasing of such questions implies the traditional view of attachment as a "thing" (trait, motivational or behaviour system) outside the interaction observed, which belongs as an attribute to the child only. The logical conclusion follows, that if the child has a "thing" *x*, one should find out the likelihood of him having the same *x* at a later time, in the presence of another person or in a different situation. There is nothing wrong with this logic. The trouble starts, however, as soon as the answers to these questions begin to pour in. The answers are typically in the form of correlational statements concerning different attachment measures, at different times in development (ages), different situations and involving different persons.

Thus, Maccoby (1971) presents us with inter-correlations of various attachment measures (e.g. proximity to mother, cries when left alone) in different situations and different ages, as well as across-age and situation correlations. Some co-efficients are high, some are low, some reach acceptable levels of statistical significance, some do not. Similar data but for different age groups is presented by Coates *et al.* (1971). Similarly, Lewis and Ban (1971) present inter-correlations of 4 "attachment behaviours" as directed towards mothers or fathers and the correlations between "attachment-to-father" and "attachment-to-mother", for both boys and girls. They found that "touch mother" and "proximity to mother" have a Pearson correlation of 0·78 for boys and 0·28 for girls; "touch father" and "proximity to father" correlate 0·66 for boys and 0·10 for girls; "touch mother" and "touch-father" correlate 0·69 for boys and 0·10 for girls; "proximity to mother" and "proximity to father" correlate 0·85 for boys and 0·72 for girls.

The pleasure and joy derived by the researcher from piecing together the "meaning" of these various correlation co-efficients are not unknown to the present writer. But putting the pleasure and intellectual exercise of the researcher aside, the information gained from such studies and their contribution to the understanding of attachment is rather low.

It is obvious that some behaviours (not only those labelled "attachment") are more likely to be generalized across situations and to different persons than others, more so for some children than for others, depending on the particular interaction chains that maintain or do not maintain those behaviours. Concepts of appropriateness of behaviour (cue properties of situation), expectations, reinforcement history and the like are eventually employed, in an *ad hoc* fashion, to "explain" the correlations found. It does not mean, however, that following these interpretations, we "understand" the problem of the *stability* of attachment any better.

The change of orientation towards the concept of attachment proposed by the present writer dismisses the question of "stability" as meaningless and at best, as irrelevant. When attachment is defined in terms of characteristics of mother–child (or person–child) interaction, the interesting questions revolve around the changes in the patterns of interaction, when interaction is with different persons, in different situations and at different ages rather than its "stability". Furthermore, explicating the *psychological* variables involved in those different situations (e.g. the emotional habituation to the unfamiliar situation), persons (e.g. the impact of differential recognition) and ages (e.g. differential perceptual/social experience) and relating these variables to the changes found in the interaction patterns between person and child, will add considerably more to our understanding of attachment than correlational statements of stability of N number of behaviours. In other words, the orientation which equates attachment with person–child interaction rather than regarding it as something else which *results* from such an interaction, will look for consistent changes in the patterns of interaction at time t_n as a function of variations in patterns of interaction at time t_k.

A study approximating this interest, though still employing the traditional concept of "attachment" is the one presented by Ainsworth and her colleagues (1971). Similarly, our orientation will look for consistent changes in patterns of interaction with person$_{ST}$ as a function of variation in patterns of interaction with person$_{M}$ and so on.

CONCLUSION

Two types of difficulties resulting from the conceptualization of attachment as something that exists outside a given interaction between a person and a child, have been described. One concerns the search for "indices" and the other concerns the search for "stability" of attachment. These problems prove to be non-issues when one regards attachment as an interaction only.

The main question posed for this alternative approach is whether all interactions are attachments, and if not, how can we characterize attachment-interactions as opposed to non-attachment-interactions? A similar question exists for the traditional approach—when can smiling, crying and vocalization, reaching be classified as attachment behaviour and when are they not? The answer is typically given in terms of "instigating", "terminating" or "reinforcing" stimuli (cry *upon* separation, cry *for* attention, smile *to* approaching person etc.). Thus it is demonstrated again that attachment cannot be understood as a piece of behaviour on its own, only within a specific interaction sequence. The detailed specifications of an attachment interaction sequence may vary with different theories depending on which aspect of the interaction the theory wishes to emphasize.

This paper remains basically neutral to any theory of attachment. It presents a point of view in regard to some basic issues in the application of the theoretical concept of attachment to empirical research which cuts across all relevant attachment theories (Ainsworth, 1969).

This paper proposes that regarding attachment as certain characteristics of person–child interaction rather than as a "summary construct" attributed to a child, may lead to more fruitful and meaningful investigations of the psychological processes involved in attachment. Our question is therefore: "What interaction is an attachment interaction?" rather than "Who is the attached child?" Similarly, our question is: "What are the factors that modify the characteristics of the interaction, situationally and over time and why do these factors influence the interaction the way they do?" instead of "Does the attached child show the same amount of attachment to other people, in various situations and at different ages?"

SUMMARY

This paper suggests that a change in the conceptualization of attachment is required in order to avoid certain research impassés. In particular, problems arising from work on the "stability" of attachment and on the relationship between its various "indices" are discussed. Attachment should be viewed as patterns of interaction between two human beings and not as a "thing" which *results* from such interactions. It is suggested that regarding it as certain characteristics of person–child interaction rather than as a "summary-construct" attributed to a child, may lead to more meaningful investigation of the psychological processes involved in attachment.

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AFFECTIVE DISORDER AMONG THE RELATIVES OF HYPERACTIVE CHILDREN

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In 1960 Anthony and Scott exhaustively reviewed the question whether manic-depressive psychosis occurred in children below the age of twelve, and concluded that this event "as a clinical phenomenon has yet to be demonstrated". The only further evidence published since then has been Annell's (1969) report of a case of manic-depressive psychosis in a 14-year-old girl who might have had an earlier episode at the age of 9. There have also been reports of depression in childhood (Frommer, 1968; Poznanski and Zrull, 1970), but these concern unipolar rather than bipolar affective disorder. The question is therefore still not settled.

Manic-depressive disorder may appear in a different form among children, which would explain the difficulty in resolving a debate that has gone on for a long time (Gregory, 1914; Kasanin, 1931; Sadler, 1952; Campbell, 1952). One possible form is that of the "hyperactive child", who is unusually active, distractible, impulsive, emotionally labile and sometimes euphoric. The similarity of case reports of mania in children (Kasanin, 1931; Sadler, 1952) to the description of the hyperactive child (Laufer and Denhoff, 1957; Stewart *et al.*, 1966) makes this idea seem plausible and worth testing.

If there is a relationship between the two conditions, it would probably be reflected in the family histories of hyperactive children, since the incidence of affective disorders is considerably higher among the primary relatives of probands than it is in the general population (Stenstedt, 1952). We have therefore studied the family histories of a group of hyperactive children and of appropriate controls.

METHOD

Children were diagnosed as hyperactive if both parents and teachers reported that they had been unusually active, distractible, impulsive and excitable for years; Stewart *et al.* (1966) have described the syndrome of hyperactivity in detail. Children whose intelligence was below normal, or who had severe language, coordination, or other neurologic dysfunctions were excluded. Children in the study were all living at home with their natural or adoptive parents, they were attending school and were of Caucasian origin. The personal and social data are shown in Table 1.

For the "biological family" group, we took 50 children at random from those children who had been seen in the Psychiatry Clinic at St. Louis Children's Hospital over a 4-yr period, and who had been diagnosed as hyperactive. The control

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TABLE 1. COMPARISON OF SAMPLES

	Biological $N=59$	Adopted $N=35$	Control $N=41$
Percent of males	97	89	95
Child's age	10·9	11·2	10·0
Mother's age	38·1	42·8	37·1
Father's age	41·9	44·8	39·9
Child's sibship size	3·6	2·2	3·2
Ordinal position of child	2·5	1·4	2·3
Family occupation status*	2·9	3·9	3·5

*Scored as: 0—unemployed; 1—unskilled labor; 2—skilled or semiskilled labor; 3—clerical; 4—managerial or own business; 5—professional.

group consisted of children who had been admitted to the hospital within the period of a year for operations such as appendectomy or herniorrhapy, and who matched the original hyperactive subjects for age and sex. When the parents of the control children were interviewed, we found that there was a hyperactive child in 9 of the families, and we therefore transferred these children to the "biological family" group. We found a group of adopted hyperactive children by searching the records of the Psychiatry Clinic, and by asking individual private psychiatrists and pediatricians for subjects.

Ninety per cent of the parents in the "biological family" and control groups agreed to be interviewed, and 80 per cent of the parents in the "adoptive family" group. The parents were interviewed individually in their homes, using a structured interview which covered the psychiatric and medical histories of the parents and their immediate relatives. Further details of the methods used have been reported by Morrison and Stewart (1971).

To be classified "bipolar affective disorder" a parent or other relative had to have had both manic and depressive mood swings leading to psychiatric treatment. We called a subject "unipolar depression" if she or he had: (1) been hospitalized for a clear cut depressive episode of any duration; (2) had a depressive episode lasting longer than 1 week which was not treated but in which six or more of the following symptoms were present: crying spells, poor concentration, anorexia, weight loss, insomnia, constipation, agitation, suicidal ideas, slowed thinking, loss of libido, and social withdrawal. Any parent who had had an episode of sadness lasting a week or more, but which did not meet the above criteria, was scored as "possible depression". Other relatives who were not personally interviewed were called depressed if they had had a "nervous breakdown" which remitted, or had been treated for depression, or had committed suicide, or if the informant was able to give a definite history of a self limited illness characterized by depression and some of the above mentioned symptoms. We inquired about all uncles' aunts, and grandparents of the children. Data on siblings were not obtained since most of them had not passed into the age of risk for affective disorder.

RESULTS AND DISCUSSION

Table 2 shows the prevalence of affective disorder in the natural and adopting parents of hyperactive children, and the parents of the controls. Four parents, all mothers, were diagnosed as having had bipolar affective disorder; 2 of these were natural parents of hyperactive children and 2 were control parents. All 4 had had periods of both depression and mania which had been treated by psychiatrists. The incidences of this type of affective disorder in the natural parents of hyperactive children are well below the figures reported by Cadoret, Winokur and Clayton (1970) for the mothers and fathers of male probands with bipolar affective disorder (26·6 and 6·8 per cent respectively). The fact that the mean ages of the mothers and fathers were only 38 and 42 respectively should not invalidate this comparison since the median age of onset of bipolar affective disorder is 30 according to Winokur (1970), and also since the morbid risk for parents in Cadoret's study was thought to be underestimated. The low incidence in parents of hyperactive children and the lack of difference between the groups of parents seem to argue against a relationship between manic-depressive (or bipolar affective) disorder and the syndrome of the hyperactive child.

TABLE 2. NUMBERS OF PARENTS WITH BIPOLAR, UNIPOLAR AND POSSIBLE AFFECTIVE DISORDERS

	Bipolar	Unipolar	Possible	Total
Natural mothers ($N=59$)	2 (3·4)*	5 (8·5)	7 (11·9)	14 (23·8)
Natural fathers ($N=59$)	0	6 (10·2)	2 (3·4)	8 (13·6)
Adopting mothers ($N=35$)	0	3 (8·6)	5 (14·3)	8 (22·8)
Adopting fathers ($N=35$)	0	2 (5·7)	0	2 (5·7)
Control mothers ($N=41$)	2 (4·9)	4 (9·8)	0	6 (14·7)
Control fathers ($N=41$)	0	2 (4·9)	2 (4·9)	4 (9·8)

*Percentages in parentheses.

The incidence of unipolar affective disorder (depression) was essentially the same in the three groups of parents. The combined figures for unipolar affective disorder and possible depression also seem to have been quite similar in the three groups of fathers, but they tended to be greater among the mothers of hyperactive children than among the controls' mothers. This difference might reflect the fact that mothers, in particular, of hyperactive children experience chronic and severe frustration.

TABLE 3. INCIDENCE OF DEPRESSION IN SECOND-DEGREE RELATIVES IN PER CENT

	Biological		Adopted		Control	
	N	% Depressed	N	% Depressed	N	% Depressed
Aunts	136	5·1	90	6·7	97	3·1
Uncles	121	3·3	107	1·9	101	0
Grandmothers	118	8·5	68	7·4	82	3·7
Grandfathers	118	7·6	68	2·9	82	2·4
Total 2nd degree relatives	493	6·1	333	4·2	362	2·2

The life time incidence of depression was significantly greater among the combined second degree blood relatives of hyperactive children (Table 3) than among the relatives of controls ($\chi^2 = 6{\cdot}5$, $d.f. = 1$, $p < 0{\cdot}02$), but there was no difference between the incidence in natural relatives and in relatives by adoption. It is difficult to relate this finding to the data on the first degree relatives. The figures in Table 3 presumably represent the incidence of unipolar affective disorder since no cases of mania were reported among these relatives. But the apparent difference between incidence in natural relatives of hyperactive children and in relatives of normal children is not paralleled by differences between the corresponding groups of parents.

SUMMARY

We determined the incidence of bipolar and unipolar affective disorder among the natural relatives of 59 hyperactive children, the "legal" relatives of 35 adopted hyperactive children, and the relatives of 41 control children. There were no significant differences in incidence of the two conditions between the groups of relatives, except for a greater incidence of unipolar affective disorder in the combined second degree blood relatives of hyperactive children than in the relatives of controls. Moreover, the incidence of bipolar affective disorder in the natural parents of hyperactive children was much lower than figures reported for the parents of patients with this type of affective disorder. Our data do not support the idea that hyperactivity is a childhood form of manic-depressive psychosis.

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SUSTAINED ATTENTION IN HYPERACTIVE CHILDREN*

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SEVERAL authors have suggested that a major problem with hyperactive children is an inability to attend to a stimulus source (Cromwell, Baumeister and Hawkins, 1963; Ounsted, Lindsay and Norman, 1966). Few attempts, however, have been made to specify in detail the nature of this hypothesized deficit. For example, it is not known whether the deficit is manifested on all tasks, independent of the nature of the task and the length of time attention has to be maintained on the task. The present study was designed to investigate the relation between these two variables and the attentive behavior of hyperactive children of normal intelligence.

An earlier study (Sykes *et al.*, 1971) indicated that on an experimenter-paced parents of patients with this type of affective disorder. Our data do not support the task of between 3 and 5 min duration, namely the Continuous Performance Test (Rosvold *et al.*, 1956), hyperactive children detected fewer of the significant stimuli than a control group of normal children matched for age, sex and I.Q. The hyperactive group also made more errors, that is, they made more reponses to non-significant stimuli than their controls. The results of this first study would suggest that on an experimenter-paced attention task at least, the performance of hyperactive children is significantly inferior to that of control children. The purpose of the present investigation was to replicate and extend this first study. This time an auditory form as well as the usual visual form of the experimenter-paced task (Continuous Performance Test) was used. Furthermore, the hyperactive and control children were also compared on a self-paced task, the Serial Reaction Task (Broadbent, 1958). Both the Serial Reaction Task and the Continuous Performance Test require continual work over lengthy periods of time. However, on the former task the subject himself rather than *E* sets the pace at which he works, and the stimuli to which he is required to respond remain present until he has responded.

Whereas the Continuous Performance Test and the Serial Reaction Task require the subject to maintain attention to the task over a prolonged period of time, the third task (a Choice Reaction Time task) examined the ability of hyperactive children to direct their attention to a stimulus source for brief periods of time. With this task each trial is a discrete unit. Prior to the onset of the stimulus the subject is oriented to the screen and is warned that the stimulus is about to appear. Thus

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each trial requires a brief period of attention of the order of a few seconds prior to the emission of a response.

It was hypothesized that the hyperactive children would perform more poorly than the normal children on all three tasks, but that the deficit would be most noticeable on those tasks that were of long duration and which were not under the control of the subject.

METHOD

Subjects

There is no exact specification of hyperactivity in terms of a measured quantity of activity (Cromwell, Baumeister and Hawkins, 1963). The clinical picture presented by such children is, however, well documented (Burks, 1960; Laufer and Denhoff, 1957; Stewart, 1970; Werry and Sprague, 1969). A variety of symptoms may be associated with individual hyperactive children (Conners, 1970). But, as Schulman, Kaspar and Throne (1965) and Werry and Sprague (1969) point out, it is not solely the restlessness of such children that brings them into conflict with their socio-familial environment, but the fact that much of their restless behaviour is inappropriate in the context in which it occurs.

In the present study, children were included in the clinical sample if the major complaint was that of overactivity, which complaint had to be made by both the child's parent and the child's teacher. Furthermore, the hyperactivity had to have been present since early childhood and to be sustained throughout the day. The definition of such children was, accordingly, an operational one based on the selection criteria used. To increase the homogeneity of the sample, all the selected children were of normal intelligence, attending regular school classes and living at home with at least one parent. Additionally, all children were screened by the child psychiatrist and any children with signs of emotional disturbance, epilepsy or gross brain damage were excluded.

Twenty hyperactive and twenty normal control children matched for age, sex and WISC Full Scale I.Q. (Wechsler, 1949) were tested. Their ages ranged from 5 yr 10 months to 11 yr 5 months (mean age hyperactive group = 8 yr 2 months, *s.d.* = 1 yr 2 months; control group = 8 yr 3 months, *s.d.* = 1 yr 8 months). There were 17 boys and 3 girls in each group. All children had I.Q.s above 80 (mean I.Q. hyperactive group = 102, *s.d.* = 13; control group = 103, *s.d.* = 12).

Measures

(a) *Choice Reaction Time* (*CRT*). The Choice Reaction Time task required the *S* to press a push-button corresponding to the particular stimulus appearing on a screen. Three conditions were used. In the first condition there were only two stimuli which appeared on the screen, either a triangle or a circle. In the second condition four stimuli were used: a triangle, a circle, three small circles drawn in a horizontal line and three horizontal lines. For both the above conditions the stimuli on the screen and on the push-buttons were white figures on a black background. In the third condition the same four stimuli as in the second condition were used except that, instead of white shapes on a black background, each of the shapes had a different colored background. In this condition the colored background which appeared with a particular shape on the screen was always discrepant with the colored background associated with the shape on the push-button. In other words, the color was designed to act as a distractor.

In each of the three conditions there were four practice trials followed by 12 actual trials. As each trial was a separate, distinct unit, the *S* was required to attend to the task at any one time for only three or four seconds. The appearance of the stimuli on the screen was randomized within each condition, with the restriction that each shape occurred with equal frequency.

(b) *Serial Reaction Task* (*SRT*). The stimuli to which the *S* was required to respond were lights. There were five lights, each associated with an individual push-button. At the start of the task, one light would be turned on and *S* would be instructed to tap the button corresponding to the light, thus turning it off. Immediately another light would appear which the *S* was to turn off, and so on. The order of appearance of the five lights was randomized over a series of 100 stimuli and this series was repeated for a total period of 9 min.

(c) *Continuous Performance Test* (*Visual Mode*) (*CPT* (*V*)). The stimuli for this test were twelve letters. One letter at a time appeared on a screen, with a stimulus duration of 0·2 sec and an interstimulus interval of 1·5 sec. The significant stimulus to which the *S* was instructed to respond was the letter *X* when it was immediately preceded by the letter *A*. The twelve letters were randomized over a series of 100 stimuli, with the restriction that there were 15 significant stimuli (i.e. *A* followed by *X*) within the total run of 100 stimuli. With an interstimulus interval of 1·5 sec, the total run of 100 stimuli took 2·5 min to complete. As the task itself lasted for 15 min, this meant that within one testing session the run of 100 randomized stimuli was repeated six times. There was also a set of 25 practice stimuli.

(d) *Continuous Performance Test* (*Auditory Mode*) (*CPT* (*A*)). The stimuli for the auditory form of the CPT were the same twelve letters as used in the visual form. The letters were recorded on a tape by a female voice at an interstimulus interval of 1·5 sec. Again, the significant stimulus was the letter *X* when preceded by the letter *A*, and the order of appearance of individual letters during the run of 100 stimuli was identical to that in the visual form of the CPT. The run of 100 stimuli was repeated six times so that a single session on the task lasted for 15 min. There was also a practice set of 25 stimuli.

Procedure

The majority of the children were tested in the morning, each being seen individually. Each *S* took the tests in a small room adjacent to *E*'s room and connected to it by a one-way screen. During the actual testing *E* observed *S*'s behaviour through the one-way screen, and during the visual form of the CPT *E* recorded on an event recorder all gross movements of *S*'s head and eyes away from the screen.

Design

To control for the extraneous variable of order of administration of the four tests, each of the 20 *S*s in both the hyperactive and control groups were assigned randomly to one of the 24 possible task orders (i.e. incomplete counterbalancing).

In the case of the CRT there were three conditions and thus six possible orders, and *Ss* were again assigned to one of these orders with the restriction that not more than 8 *Ss* (4 hyperactive and 4 controls) were assigned to any one order.

RESULTS

Reliability of the measures

The test-retest reliability of each of the four attention tasks was assessed by computing product-moment correlation coefficients (Ferguson, 1959) between the initial and retest performance two weeks later of 12 (randomly selected) of the 20 *Ss* in the hyperactive group. The majority (seven out of nine) of the test-retest coefficients on all four attention tasks reached statistical significance ($p < 0{\cdot}05$), ranging in size from $+0{\cdot}50$ to $+0{\cdot}87$. From this it may be concluded that the responses of hyperactive *Ss* were reasonably consistent from initial testing to retesting 2 weeks later.

Inspection of the initial and retest performance of the 12 hyperactive children indicated that the Choice Reaction Time Task and the Serial Reaction Time Task were both subject to improvement with practice, but practice had no effect on the Continuous Performance Test. There was no relationship between the improvement with practice and the size of the reliability coefficients.

Age, I.Q. and the four attention tasks

The performance of both the hyperactive and the normal control children on all four tasks was generally found to be related to the age of the child, fourteen of eighteen correlations reaching significance ($p < 0{\cdot}05$). On the other hand, intelligence was rarely found to be related to performance, at least within the I.Q. range (above 80) used in the present study (only two of eighteen correlations reached significance).

Choice reaction time

The reaction times of the hyperactive and control *Ss* on the CRT for the three conditions were analyzed by means of a repeated measures design analysis of variance (Winer, 1962). The main effect for Groups was not significant, indicating that the reaction times of the hyperactive and control *Ss* were similar on this task ($F = 0{\cdot}046$, $d.f. = 1/38$, *NS*). However, the main effect for Condition was significant ($F = 62{\cdot}12$, $d.f. = 2/76$, $p < 0{\cdot}001$). This finding indicates that *Ss* in both groups took longer to respond when there were four stimuli + a color distractor (mean = 2·58, *s.d.* = 0·25) than when there were four stimuli alone (mean = 2·27, *s.d.* = 0·29) or two stimuli alone (mean = 1·94, *s.d.* = 0·21) ($p < 0{\cdot}005$ for all comparisons by Duncan's Test). The *F* value for the Groups × Conditions interaction was not significant.

Serial reaction task

The number of correct and incorrect responses made by the hyperactive and control *Ss* over the three, 3-min periods of the SRT were also analyzed by means of two, two-way repeated measures analyses of variance. The hyperactive *Ss* did not differ from the normal *Ss* with respect to mean correct responses on the SRT ($F = 1{\cdot}59$, $d.f. = 1/38$, *NS*). However, the hyperactive *Ss* made significantly more incorrect responses than did the normal *Ss* ($F = 4\cdot63$, *d.f.* $= 1/38$, $p < 0\cdot05$; mean hyperactive group $= 29\cdot15$, *s.d.* $= 18\cdot11$; mean control group $= 18\cdot85$, *s.d.* $= 11\cdot47$). In the analyses of both correct and incorrect responses there were significant main effects for Period ($F = 54\cdot42$, *d.f.* $= 2/76$, $p < 0\cdot001$ for correct responses and $F = 5\cdot43$, *d.f.* $= 2/76$, $p < 0\cdot01$ for incorrect responses) which indicated that the performance of both groups of *Ss* deteriorated at a similar rate with time on the task.

Continuous performance test

A three-way repeated measures analysis of variance [Groups × Task (Visual/Auditory) × Period (three, 5-min periods)] completed on the *correct* responses of the 40 *Ss* yielded the following significant factors: Groups ($F = 14\cdot45$, *d.f.* $= 1/38$, $p < 0\cdot005$); Task ($F = 115\cdot20$, *d.f.* $= 1/38$, $p < 0\cdot001$); Period ($F = 9\cdot52$, *d.f.* $= 2/76$, $p < 0\cdot01$) and Groups × Period ($F = 5\cdot25$, *d.f.* $= 2/76$, $p < 0\cdot05$). A similar analysis completed on *incorrect* responses resulted in significant F values for only Groups ($F = 15\cdot22$, *d.f.* $= 1/38$, $p < 0\cdot005$) and for Groups × Period ($F = 3\cdot94$, *d.f.* $= 2/76$, $p < 0\cdot06 > 0\cdot05$).

The significant Group factors obtained in both analyses indicated that the hyperactive children made fewer correct and more incorrect responses than the control children on the CPT (visual and auditory forms combined). Furthermore, both groups made fewer correct responses to the auditory (mean $= 59\cdot10$, *s.d.* $= 19\cdot08$) than to the visual (mean $= 77\cdot88$, *s.d.* $= 13\cdot28$) form of the CPT and made significantly fewer correct responses with time on the task (i.e. Period factor). The performance of the hyperactive children, however, deteriorated markedly with time on the task while that of the control children did not, hence the significant Groups × Period interaction when both correct and incorrect responses were analyzed. These effects and interactions are illustrated in Fig. 1.

Within the incorrect responses score three broad categories of errors were identified, namely anticipatory responses (e.g. a response to the letter A before the next letter had arrived), slow responses (a response to a significant stimulus but too slow to be counted as a correct response) and random responses (to non-significant stimuli other than *A* or *X*). The hyperactive *Ss* made significantly more ($p < 0\cdot05$) anticipatory errors and random responses on both forms of the task than the control

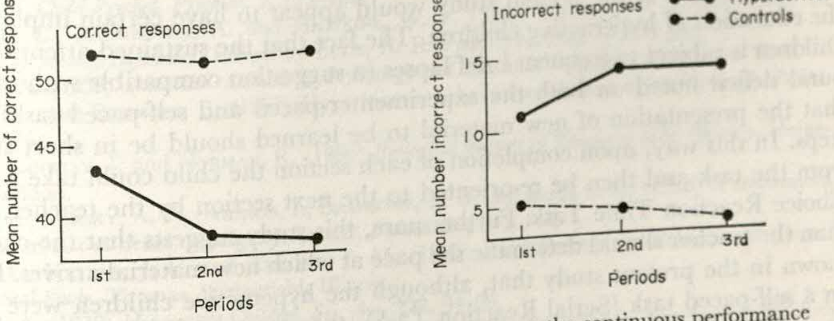

FIG. 1. Comparison of the hyperactive and control groups on the continuous performance test (visual and auditory combined) over periods.

Ss. However, the two groups did not differ with respect to slow responses on the auditory form of the CPT, although they did differ on the visual form ($p < 0{\cdot}05$), the hyperactive group making significantly more of such errors.

In addition, the hyperactive group made significantly more multiple presses ($p < 0{\cdot}01$: mean hyperactive group = 3·00; mean control group = 0·80) and significantly more non-observing responses (as recorded by E on the event recorder during testing) than the control group ($p < 0{\cdot}01$: mean hyperactive group = 6·70; mean control group = 0·30).

DISCUSSION

The statement that hyperactive children of normal intelligence have an attentional deficit is supported by the results of the present study, as is also the hypothesis that the nature of the deficit is an inability to maintain attention to a stimulus source over a prolonged, but not brief, period of time. It is also clear from the study that the behavioural manifestation of this deficit is not independent of the nature of the tasks involved.

There was no impairment in performance on the Choice Reaction Time Task, a task which required the discrete allocation of attention for brief periods. Behavioural impairment was seen, however, on both of the tasks requiring sustained attention, namely the Continuous Performance Test and the Serial Reaction Task, with the impairment being most serious on the former, or experimenter-paced task. On this task the hyperactive children made both fewer correct responses and more incorrect responses than the control children, whereas on the Serial Reaction or self-paced task the only difference between the two groups was with respect to the incidence of incorrect responses.

In addition to the impairment in sustained attention, hyperactive children also appear to lack inhibitory control. On the Continuous Performance Test they made significantly more anticipatory responses than the control children and more multiple responses. These results support the findings of Conners and Greenfeld (1966) who found that hyperactive children lacked inhibitory control and also those of Campbell, Douglas and Morgenstern (1971) who found that hyperactive children responded impulsively on a task requiring the abstraction of a simple figure from a complex one.

The findings of the present study would appear to have certain implications for the education of hyperactive children. The fact that the sustained attention of these children is subject to frequent brief lapses (a suggestion compatible with the behavioural deficit noted on both the experimenter-paced and self-paced tasks) suggests that the presentation of new material to be learned should be in short sections or steps. In this way, upon completion of each section the child could take a short rest from the task and then be re-oriented to the next section by the teacher, as in the Choice Reaction Time Task. Furthermore, this study suggests that the child rather than the teacher should determine the pace at which new material arrives. For it was shown in the present study that, although the hyperactive children were impaired on a self-paced task (Serial Reaction Task), they were relatively more impaired on an experimenter-paced task (Continuous Performance Test), at least with respect to correct responses. In other words, the presentation of small bits of new information in systematic steps, where the steps are regulated by the child himself, as with teaching machines, would probably be better than more conventional teaching methods where the teacher largely controls the speed of presentation of information.

The study also provided evidence that both hyperactive and normal children attend more efficiently to the visual than to the auditory form of the CPT. No direct conclusions can be drawn with respect to this finding since the two tasks could not be said to be equated on all relevant dimensions, such as distinctiveness or intensity of stimuli, etc. However, the finding tentatively suggests the visual modality as being the more effective medium for communicating information with young hyperactive children. Obviously, future studies which manipulate variables such as these within the actual teaching situation are needed if we are to find ways of minimizing the learning deficits which are now such an outstanding characteristic of hyperactive children (Burks, 1960; Weiss *et al.*, 1971).

SUMMARY

The ability of hyperactive children to maintain attention on three tasks was examined. One of the tasks, a Choice Reaction Time Task, measured attention for brief periods, while the other two measured sustained attention. Of the latter two, one was an experimenter-paced task (the Continuous Performance Test) and the other a self-paced task (the Serial Reaction Task). It was found that the hyperactive children were no different from their normal controls in their ability to direct their attention for brief periods. They were, however, significantly inferior to the controls in their ability to sustain attention, particularly on the experimenter-paced task.

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BOOK REVIEWS

Social Work in Foster Care. Collected papers edited by ROBERT TOD. Longmans, London, 1971, pp. 189. £1.20.

THIS is a collection of thirteen papers by Social Workers which Mr. Tod has grouped in five sections under the headings: (1) Foster Home Study; (2) Social Work after Placement; (3) Social Work with the Child's Own Parents; (4) Group Work with Foster Parents; (5) Group Work with Children in Foster Care. There is a final section which is headed "The Foster Mother and the Foster Child", and the first is a paper by a foster mother and the second a letter from a foster child to her grandmother.

A collection of papers like this is of great value for a number of reasons. Firstly, because Social Workers are very busy and it is difficult to find time to read the journals which come regularly through one's letter box; but it is even more difficult to seek out articles of interest and value in publications which one rarely gets a chance to see. So it is very worthwhile to have them collected together by someone else.

Secondly, at the present time there are hundreds of Social Workers with experience in the fields of Health and Welfare, but who are now having to work in this immensely complex area of child care. To have a collection of papers on one aspect of this subject in an easily readable form will be invaluable to these workers, but to have papers of such a high standard is a bonus.

Thirdly, for myself, with over twenty years' experience in the child care field, I found some new ideas and much to set me thinking again in this collection.

In the 1950s the use of foster parents was a means of caring for deprived children which was very popular. This was partly because it was believed to be preferable to bring children up in as normal a family situation as possible, rather than in a residential situation, but also because it was the cheapest form of care.

In the 1960s, boarding out became unfashionable, and it seems unlikely that there will be an increase in boarding out over the next few years. It has to be a long slow careful process to assess foster parents and to introduce children to prospective foster homes. Foster parents also need a great deal of support after children are placed or it is likely that the situation will either break down or develop into a *de facto* adoption situation against the wishes of the social worker, and possibly against the interests of the child.

Most of the papers collected here were written by Americans, but fortunately they are in English and this helps!

Among the papers which I found most interesting were:

(1) *No. 1—The Group Method in Foster Home Studies*

This describes a series of three group meetings with prospective foster parents, during which certain of the workers in an agency shared with the couples attending the meetings their ideas on foster care, the requirements of the agency, the role of the agency and the needs of the foster children, the natural parents and the foster parents themselves. Husbands and wives were expected to come together to these sessions which proved of immense value later in the home after the child had been placed. The foster parents seemed more aware of the true nature of their task and more open to discussion and help from the social worker than foster parents assessed in isolation in their own homes.

(2) *No. 6—Use of Family Sessions in Foster Home Care*

Instead of having individual interviews with the foster mother and the child and almost ignoring other members of the family, as is so often the custom in working in foster homes, the social worker saw the whole family together, including the foster child, and there were joint discussions on the meaning to the group of this fostering situation. The foster parents achieved a more open approach to the whole situation and there was less anxiety about what the foster mother or the child said to the social worker. I think it would be difficult to use this method with a foster home which had been vetted in the usual way by the social worker only visiting the home. It might be a more fruitful method of working with foster parents who had taken part in the sort of group session describde in paper No. 1.

(3) I also found the two papers in Section 5 of great interest. They described working with a very small number of foster children in a group situation, and talking with them about their problems of being foster children. There is no indication of what the foster parents thought about this method of working with their foster children.

(4) Neil Kaye's paper on *Foster Parents as Resources* is a most salutary one. He suggests that we may have lost a great many foster parents because we have not given them enough consideration and support once the children have been placed. If we were more meticulous over this, we might have to spend less time in recruiting new foster parents. There is perhaps a parellel here in our dealings with residential child care staff. We also take this group of people very much for granted. They often work in comparative isolation and in direct contact with the children; they also have to cope with natural parents, often unsupported by anyone else. There is a very considerable turnover of residential staff and perhaps if we gave them more support and consideration we should spend less time in recruiting new one.

I shall keep this book close to hand as I know that I shall come back to it again and again.

MARY G. JOYNSON

Infantile Autism: Concepts, Characteristics and Treatment. Ed. MICHAEL RUTTER. Churchill-Livingstone, Edinburgh, 1971, pp. xi + 328 £3.50.

THIS book consists of a series of papers presented to a study group for research workers organised by the Institute for Research into Mental Retardation and held in London in June, 1970. The aim of the study group was "to bring together interested scientists in key areas to discuss relevant findings and views and to suggest new strategies and future developments" (p v). After a disclaimer for comprehensiveness caused by the inability of certain people to attend and the unevenness of the development of research, the editor states the aim of the book: "to bear witness to the vitality of recent research and to developments which are taking place in concepts of this uncommon but important disorder" (p. viii).

There are some 20 authors or co-authors, three quarters of whom are from the U.K., with, apart from a lone Frenchman and a token representative from the Southern hemisphere, the rest coming from the U.S.A. The book is divided into seven sections (each of which is followed by a short discussion from the floor). (1) Classification, (2) Perception and Social Responses, (3) Language—experimental approaches, (4) Language—comparative and clinical approaches, (5) Behavioral approaches to treatment, (6) Education, (7) Speech therapy. It ends with a short concluding statement by Eisenberg, a list of participants and a more than adequate index of contents and authors cited in the text.

The section titles indicate their content only approximately and there are some strange bedfellows in the sections on classification, and behavioral approaches to treatment. This lack of neatness is no doubt the result of people rather than papers being invited. Despite these shortcomings the sections do give a desirable if imperfect inner coherence.

However, the book is not as truly comprehensive as the titles of the sections might suggest for the divisions are quite uneven in development. That on education, for example, has only a single paper reporting an attempt to study three different approaches to educating autistic children. Further, the sections do not offer a broad spectrum of views say on classification or etiology or on treatment approaches, but rather (perhaps not surprisingly) represent what might now be properly called the Rutterian view of autism. This view is set out in his forward (p. vii–viii) namely that autism is, (1) a disorder (i.e. a disease or taxonomic entity), (2) manifested before 30 months of age, (3) characterised symptomatologically by defects in the development of social relationships, global impairment of language and rigid or ritualistic patterns of behavior, (4) different from schizophrenia, (5) of organic etiology or etiologies, and (6) due to some cognitive/language defect with the disorders of behavior secondary to this.

As is inevitable in collections of papers by many authors, contributions vary in quality and style.

They present in their opening paragraphs or reviews of the relevant literature, a considerable degree of repetitiveness. Also to be expected are what might be called a lot of "advertisements for myself" in which a particular author or research group proseletyses its own work. True syntheses are infrequent.

With all these shortcomings and the focus on research papers, the book is heavy going especially for someone like an unfortunate reviewer who has to read it from cover to cover. After a while the head begins to reel as one conceptual position after another is espoused, disconnected empirical findings are presented or intricate details of esoteric research are described. Fortunately, just as one is about to become completely befuddled one reaches a paper by Rutter *et al.* purportedly on "autism, a central disorder of cognition and language" but in reality a brilliant and lucid overview of much of autism. While one may perhaps question the goodness of fit of the individual pieces of the puzzle as honed down by these authors, there is little doubt that this chapter represents one of the best and most up-to-date overviews of the subject.

Other informative or ingenious but not necessarily easy papers are those by Rutter and Bartak (education), Kolvin (classification), O'Connor (visual perception), Hermelin and Frith (language), and Evans (behavior modification). Some of the others are interesting but more discursive than true research (e.g. those by Schopler and Reichler on therapy by parents and Savage on teaching language). A few of the papers (especially those by Koupernik and by Ornitz) are extremely opalescent while the remainder are of variable quality and interest. Mercifully, the Discussions coming at the end of each section have been drastically edited and condensed so that about half the time they offer some important criticism or elaboration, not a bad score for this rather pompous device.

How well does the book achieve its goals as bearing witness to the vitality of recent research and to the evolution of concepts about the disorder? The answer is that within the confines of the Rutterian view of autism, it does succeed as long as one remembers what this book is and is not. It is a collection of research papers most of which are of themselves inadequately detailed to judge the quality of the work described and serve only as a point of entry to the investigator's work, to be studied in more detail in the original and supporting papers. Anyone who expects this to be an authoritative overview of autism presented in readable form had better look elsewhere toward J. Wing's ageing but still valuable volume "Early childhood autism" or any one of the now numerous reviews by Rutter on selected aspects. The book will be a disappointment to someone who wants primarily to find out how to treat or deal with autistic children, for with one or two exceptions this is not a confident "how to do it" book in which all doubt and controversy or indeed science, is swept aside to present a technology of management (whether it may work or not is another matter). These searchers had better turn to Bettelheim, or Lovaas or many of the legion of clinical type papers which did and regrettably still dominate the publications on autism.

The book is thus a reference volume for specialist libraries or perhaps for those with a special interest in one of the relevant areas of research described, though it is unlikely to present enough detail or enough really new material to excite anyone familiar with the literature. Now that there is a special journal devoted to autism, one wonders what is the place of symposia like this. Do they represent useful or unique contributions? In this age of overskill in verbiage, the great need is for reviews and comprehensive and comprehensible texts which sort out the valid from the shoddy, the substantial from the trivial and point the way to fruitful research or possible applications of current knowledge. No good paper describing original research on autism is going to have difficulty finding a journal. Apart from the convenience of having similar articles all collected in the same place, which even a specialised journal like the one devoted to autism can provide, a book ought to offer something that a journal cannot, namely some kind of integrated and detailed overview. This book with its snippets rather than syntheses contains little that could not be obtained through regular reading of the few good journals relevant to the area.

The other problem relates to the omissions in this book. As pointed out by the editor, there is nothing on ethology, psychopharmacology or metabolic studies. The important behavioral approach is under-represented and at times misrepresented (as a rigid technique rather than a set of broad principles which leave the details of treatment to the ingenuity and clinical sensitivity or lack of these in the therapist). These represent significant shortcomings. Psychogenic theories, notably the psychoanalytic and its interpersonal derivatives which have preoccupied American child psychiatry for so long are only mentioned in criticism which will no doubt cause dismay in many readers though the contribution of these theories to meaningful research and to practical and economically-feasible treatment can hardly be described as substantial despite the voluminousness of such writings. Nevertheless, it would have been desirable to have this view adequately represented.

In short, a well stocked library should no doubt have this volume but the individual reader is unlikely to find it a worthwhile purchase.

JOHN S. WERRY

Social Casework: Theories in Action. Ed. HERBERT F. STREAN. Scarecrow Press, Inc. Metuchen, New Jersey, 1971, pp. 344.

SOCIAL workers (and doubtless psychiatrists) are increasingly bombarded with new theories of Man in Society, which claim to be necessary equipment for anyone who aims to help his brother contend with the Human Condition. (Some of the more ambitious seek to induce us to join the enterprise of changing the Human Condition, though here motivation seems to outrun technology.) This smallish volume is in some senses a handbook of traditional and contemporary theories which claim to be relevant to our task—psychoanalytic theory, social systems theory and those concerning role, organisation, communication, small groups, and the "behaviour modification model". But it is also more than a handbook, since the editor has clearly encouraged contributors to discuss the relevance for social work of the theories they present, and their limitations and dangers in this context—i.e. their uses and abuses.

Some of the work presented here has already proved its use in therapy or social work: notably psycho-analytic and small group theory and, more recently, learning theory, as used in behaviour modification. Role theory has been commended to caseworkers, notably by Helen Perlman, and is here expounded and discussed by the editor himself. Social systems theory and organisation theory are admitted by the authors concerned to be as yet of limited value in practice, owing to the high level of abstraction at which both are formulated. Communication theory helps to illuminate what has certainly been a weakness in casework method, perhaps increasingly as it came to use the analytic model more closely, and is particularly vital for the study of cross–class or cross–cultural communication.

Psycho-analytic theory still seems to have most to contribute to the therapeutic understanding of people in trouble, and Herbert Stream expressly states that in his view much would be lost if role theory, for instance, came to supplant it as a basis for casework, rather than supplementing it. His own attempt to translate the concepts of "transference", "counter-transference" and "resistance" into a single role construct, "role induction", seems to us of dubious utility. However, his summary of relevant role theory is remarkably clear and his discussion judicious. Like many contemporaries, he stresses the problem of discordant role expectations by client and caseworker, but without implying the facile solution that the worker should always provide what the client expects. In fact he uses case material to demonstrate that the worker's choice of response should be based on diagnostic thinking and the aim of providing a "corrective experience"; the remedy for cognitive discrepancy is to recognise and discuss it, not simply to accept induction into the role expected or desired by the client.

Katherine Wood provides a very competent and useful digest of classical Freudian theory, with succinct discussion of major controversies, and includes a very clear account of "ego psychology", which tends to be less sharply differentiated in this country from the general corpus of psycho-analytic theory. She discusses the relevance of various aspects of theory for casework as she expounds them, and distinguishes clearly and valuably those techniques which are appropriate to the analytic but not to the casework situation. She acknowledges the contributions of Melanie Klein and Otto Rank, which has been unusual among main-line Freudians. She also disagrees with those who maintain that caseworkers should not "work with the transference", and ably differentiates the ways of doing so which are appropriate for analysts and caseworkers respectively.

Irma Stein presents a remarkably clear and compact account of "the systems model and social systems theory"—an undoubted boon to students and teachers in all disciplines which are now called on to incorporate these. However, owing to the high theoretical level, operational implications can often be glimpsed only through a glass darkly. Systems theory seems to provide some useful criteria for evaluating less general theories, concepts and models. It rejects the tension-reduction model of behaviour as inappropriate in relation to an open (living) system. It is indeed time this inadequate model of motivation received the coup de grace, but it seems to us an error to reject along with it the fertile model of homeotasis, which does a very useful job, on the grounds that it cannot account for the more dynamic aspects of human behaviour. The concept of entropy appears to be the rising star, but sheds only a faint light for this reviewer, especially when growth, construction and life itself are referred to in terms of "negative entropy". This appears to be a useful concept in physics, but it is not at all clear at this stage what is the advantage for social science of borrowing a term whose connotations seem remarkably inappropriate. We are also doubtful of the value (or the effect) of reducing the client verbally to "the client-system". It all seems a bit dehumanising.

This is undoubtedly a book which will be of the greatest value to social work students at the University level. The air is a bit rarefied for students not educationally equipped for university study, though the psychoanalytic section is very clear and not too condensed.

E. E. Irvine

Mental Retardation—An Annual Review No. III. Ed. J. Wortis. Grune & Stratton, New York, 1972, No price stated.

This is only the third volume of an annual collection of multidisciplinary review articles in the field of mental retardation but as a result of the high quality and comprehensive nature of the contributions, it is already established as a standard work in the field.

Once again the main disciplines are adequately represented in erudite and wide ranging chapters on clinical aspects by Kirman, neuropathology by Jervis and metabolism by Syderman. Although care has been taken to prevent overlap between these sections and that on paediatrics, the result is somewhat of a patchwork. For example, if one wished to look up recent advances in phenylketonuria it would be necessary to refer to three out of the four chapters only to find some of the points less adequately reiterated in the last of these sections. Together however, they provide a most useful review of the underlying biological determinants of retardation.

Areas of growing interest are represented by chapters on guardianship, residential care apn legislation, while a useful review of the dental problems of retarded people makes little mention of the provision of dental services which should be an important feature of any community service. In spite of promise in the preface to open up the contributions to include those from non American sources these contributions, which might have provided a useful opportunity to compare practice in different countries remain totally insular. That on guardianship makes several suggestions about the solution of this problem which must haunt the parents of the majority of handicapped children about what will happen when they die and are no longer able to maintain an interest in their care. It notes the inadequacy of provision in the United States but makes no reference to either the voluntary or statutory solutions reached for example in Britain and some Scandinavian countries. The chapter on residental care similarly makes only passing reference to research into the evaluation of different patterns of care and demonstrates the difficulties which arise when a residential care system is allowed to develop in a piecemeal fashion without the incorporation of epidemiologically based evaluative studies. Perhaps the nearest to some of the more comprehensive programmes for community residential care which are being developed in this country and in Scandinavia is that in Connecticut, but here again there is no mention of any attempt to evaluate the scheme.

One suspects that these articles are mainly directed towards the administrator of services for the retarded but like the anecdotal and gossipy article on the politics underlying federal legislation, they make strange bedfellows with such contributions as the undoubtedly useful but surely unnecessarily technical review of operant conditioning which must surely make heavy reading for not only the administrator but also the clinician wishing to evaluate advances in this expanding field.

The psychiatrist will find the comprehensive review of the aetiology and classification of psychiatric disorders in mentally retarded children by Rutter most valuable although it is clear the lack of adequate epidemiological studies in this field again provides the researcher with a formidable challenge.

Finally in the chapter on prevention by Wortis, little mention is made of the exciting possibilities raised by recent advances in prenatal diagnosis and in the prevention of mild retardation in culturally deprived children by early intervention programmes, such as that described by Heber, and of the prevention of secondary behavioural and language handicaps in the more severely retarded by parental involvement, as in the programmes described by Bricker and by Schopler.

These criticisms do not however detract from the value of this well produced and meticulously edited volume which contains items of interest for workers from all disciplines in the field of retardation but will be of particular value to the clinician and administrator and more particularly if he lives in or is contemplating a visit to the U.S.A.

JOHN A. CORBETT

The Adopted Person's Need for Information about his Background. The Association of British Adoption Agencies, 1971, Price 45p.

THIS booklet contains three papers given during a conference in Blackpool, in December 1971. In the first paper *Black Child and White Family*, Mrs. Margaret Edgar, President of the Open Door Society, Montreal, discusses the problems of identity which face the black child adopted by white parents. Mrs. Edgar poses the questions "who am I?" ,"why am I here?". She says that these are legitimate questions asked by us all at times, but they are perhaps more potent and perplexing when asked by a black child being brought up in an environment alien to his original cultural heritage. The underlying danger of bringing up a coloured child as an "English white child" is emphasised. However much his parents regard him as white, schoolfriends and neighbours will see him as black with resulting confusion and resentment in the child's struggle for identity.

This paper sets out clearly the problems facing adoptive children and their parents, it also gives some indication of the work of the Open door Society in helping parents to prepare their children realistically for life in an alien culture. It emphasises the need to give these children a pride in their culture and heritage.

In addition the Society is working towards improvement of civil rights legislation and a wider education aimed at lessening racial tensions and discriminations. We gain from their extensive experience within the community of fostering interest in the needs of these children.

The second paper *Adoptees in search of their origins*, by John Triseliotis, Lecturer in Social Administration at Edinburgh University, writes on the findings of a recent Scottish study of 70 adult adoptees who made enquiries at Registrar House about their original birth certificates which give details of their natural parents. This number represents 71 per cent of all adoptees who search into their origins in Scotland.

The aim of the research was to establish some idea of the motivation for the search and the use to which the information would be put. The findings of the research were considered by the Houghton Committee on Adoption this year. Although this paper is a brief summary of the main findings of the research, it presents a series of well defined statements about adoption practice and consequences, which support many now well established theories of adoption case work.

Many of the sample were told of their adoption at a later stage than usually advocated by adoption authorities. Adolescence seems a crisis point in determining the need to establish identity by searching for information about natural parents although any crisis, such as marriage of the adoptee or the death of adopting parents may be a precipitant in choosing to search for information.

The study touches briefly on the sense of abandonment by parents, felt by some adoptees and their resentment at being deprived of rightful knowledge of their past history. Most noticeable was the general disappointment in the quality of family relationships experienced by the adoptees. There was a general feeling of incompleteness and lack of identity.

The study is well worth reading but needs to be considered with some care since recalled experiences may be distorted and coloured by the need of the moment. It would be interesting to know how these children differ from adoptive children who do not feel compelled to search for information about their origins.

The third paper on *Work with Adopted Adults and Adolescents. The experience of a Finnish Adoption* *agency*, by Miss Elina Rautenan presents a paper which is an account of work with a group of adoptees in Finland, placed between 15 and 20 years ago with adoptive parents. About 50 to 70 adoptees out of a total of 550 adoptees each year seek information about their natural parents and the reasons for adoption. In Finland, information of natural parents is kept in a central register and can be made available easily to both natural mother and child.

The adoption staff of the agency describe the sensitive and individual work given to all enquiries for background information and it describes the many crisis situations when information about past history may be of vital importance to the adoptee. Skilled casework is offered to each enquirer to determine the precipitating crisis and how it can best be resolved. For many adoptees it is a wish to know why they were adopted and what has happened to their natural mother. For others it is a wish to understand why they were not loved or to establish their own identity and prove that they are not "bad people", a feeling that can have lasting consequences on a child's life.

The paper quotes much actual case material and offers insight into the motivation and anxieties of adoptees who approach the Society for help. It recounts a unique experience in providing this type of service for adopters and their children.

ELIZABETH IZZARD

Longman papers on social work. Social work in Adoption: collected papers. Ed. ROBERT TOD, Longman, London, 1971. £1.20.

THIS book is a collection of papers from English and American periodicals dealing with the practice of adoption. In his introduction Robert Tod makes the point that social workers concerned with adoption are torn in three directions: "at the same time they seek to identify with the natural mother, the would-be adopters and the child. It is only too easy to over-identify with one part in the threesome to the exclusion of the others. In order to preserve a balance, adoption workers need to be able to think clearly about what they are seeking to achieve through adoption and to decide where their primary obligation lies." Perhaps the "threesome" he describes should become a "foursome" and include the putative father.

It is interesting to note how much more forcefully and categorically some of the American papers are expressed. For example in the first paper, Joseph H. Reid, in discussing "Principles, values and assumptions underlying adoption practice", states that adoption agencies have a responsibility to point out to the unmarried mother the extreme difficulty, if she remains unmarried, of raising a child successfully in the American culture without damage to the child and herself. There seems to be an assumption that the "culture" is immutable and one wonders whether in the present climate of social work practice in the U.K. social workers would accept this viewpoint easily; indeed those social workers who believe in social change are trying to make it possible in terms of attitudes, emotional support and material conditions for unmarried mothers to be given the opportunity to keep their children if they so wish. His statement that "the concept that the unmarried mother and her child constitute a family is to me unsupportable. There is no family in any real sense of the word" is also one that would possibly cause controversy in the U.K.

Some of the papers in this collection were written almost twenty years ago, since which time various theoretical concepts have been challenged. It is salutory to be made so aware of how differences in attitudes and "beliefs" among social workers can influence their practice, even in the face of current research findings which hopefully should make all of us take stock.

The papers provide a useful discussion of some challenging methods of work which a few U.K. adoption agencies are already engaged in. For example Donald Gough's view in "Adoption and the unmarried mother" that a personal meeting between adoptive parents and mother with a social worker present could be helpful; Linda Burgess' plea for involving "The unmarried father in adoption planning"; the use of groups for foster/parents and prospective adopters discussed by Dorothy Hutchinson and Louise Dillow; Velma Bell's exploration of the "Special considerations in the adoption of the older child" and "Helping older children to participate in adoptive placements" by Esther Veach Muhlberger. I found "The history—giving interviews in adoption procedures" by

Lela Costin helpful and thought-provoking, but the paper on "Emotional transactions in the pre-adoptive study" by Maurice Barry, in which he discusses the role of the social worker is somewhat patronising. Florence Brown's paper on "Supervision of the child in the adoptive home" is followed by two on group counselling with adoptive families, one by Alexina McWhinnie and the other by Gertrude Sandgrund; all three dealing with adoption follow-ups at different stages, which highlights the importance of good preliminary discussions about the uncertainties adoptive parents may meet as also the need for on-going assessment and help. Donald Winnicott's views on "Adopted children in adolescence" follows this, and the collection ends with a paper written for it by Jane Rowe about "The reality of the adoptive family", in which she continues the discussion of methods of helping adoptive parents in a most sensitive way.

Although one might care to challenge some of the views expressed in this collection it is on the whole a most useful compilation of papers dealing with the processes and uncertainties of adoption for all concerned. Mr. Tod has assembled them as a coherent whole and has provided a useful synopsis at the beginning and end of each paper, the first describing content and the second details of the career of the author. He has also provided a further reading list for social workers, for adopters and for adopted children. With this collection Mr. Tod has done us a service by making readily available papers which all those dealing with adoption would do well to read.

FRAIDA SUSSENWEIN

Advances in Educational Psychology. Ed. W. D. WALL and V. P. VARMA. U.L.P., London, 1972, pp. 189, Chap. 12. £3.50.

THIS BOOK is a collection of papers by several hands intended both as a tribute to P. E. Vernon and as a "coherent statement of advances in our knowledge, mainly, but by no means exclusively, of the domains of intellectual ability and cognitive development". There is no gainsaying the fact that the contributions from fourteen contemporary indigenous psychologists constitute the former. I am not sure, however, that they do, in fact, represent a *coherent statement* of advances in our knowledge of *educational psychology*.

The collection comprises fourteen relatively short papers in the fields in which the various authors have made substantial contributions. Hearnshaw opens with an elegant and lucid sketch of the historical development of the concepts of aptitude and capacity and shows how ancient constructs linger on and how we still lack theoretical foundations for mental testing. To a limited extent this essay provides an overarching theme to the collection since most of the papers deal with different aspects of human abilities. However under this span are yoked some rather disparate studies which lead one to wonder how they "cohere". For example, Eysenck's review of research on personality and learning with particular reference to theorising by Spence and Eysenck chimes rather obscurely, it seems to me, with a report by Pickford on the incidence of colour vision defect in British art students or the discussion on the effects of ageing on intellectual performance by Chown.

However, although the unity claimed for the book may be somewhat difficult to discern, the papers themselves are of interest and relevance, each a useful, if sometimes limited view of the state of the art in its particular field.

The paper by Clarke and Clarke performs an important function in drawing attention to the shaky foundation of much of the evidence adduced to illustrate the "ineffectiveness" of "Higher Horizons" approaches, and which underpins arguments about the crucial nature of pre-school abilities in relation to adult performance. Wiseman discusses the importance of teacher attitudes especially in the field of expectancy and comments sharply on the failure of colleges of education to produce teachers more open minded in their attitudes to innovation particularly in infant schools. Lovell reviews recent work on the growth of operational thinking and Butcher reporting British work on divergent thinking and creativity has some pertinent remarks on the state of play in this currently fashionable game. Kane discusses the mental and personality correlates of motor abilities and presents some interesting views on the nature of an integrated approach to the relationship of *psyche* and *soma*.

Interesting though the various contributions are one might wonder whether all readers will feel that the title offers more than the book provides. It depends, of course, on what you mean by *educational psychology*. But it is somewhat disappointing that only one contribution comes to grips with problems directly related to classroom teaching, a subject which I take to be of some relevance in this field. Peel and De Silva report on interesting work on problems related to the teaching and learning of history in secondary school. Their experiments look at the way in which teachers try to teach such concepts and shed light on the problems inherent in an excessive reliance on entirely verbal approaches. On the other hand, the evidence adduced by Eysenck to support his theses on the effects of personality on school learning is considerably less convincing since it refers almost entirely to rote or near rote learning.

There is an enigmatic "1" after the title on the title page and on the jacket. The implication is that there is more to come. Perhaps we can look forward to a fuller treatment of school learning in some future publication.

E. STONES

Adolescent Separation Anxiety. H. G. HANSBURG. Charles C. Thomas, Springfield, 1972, pp. xv + 190. $15.75.

THIS book is about a newly designed test concerned with the emotional reactions of young teenagers to a variety of experiences with one thing in common, that they involve temporary or permanent separation from relatives or friends and a change of environment, that is *separation*. The author is an American psychologist interested in psychotherapy and psychoanalytical theory.

The test consists of a set of twelve pictures, each with a title. Some of the subjects portrayed are everyday separation experiences such as going to bed or leaving for school in the morning. Others are less frequent happenings like changing class at school or going to camp. More disturbing events such as mother going to hospital, father leaving home after a row, or mother's death, are included. Some of the situations are concerned with antisocial behaviour such as being sent to an institution by a court and running away from home.

The titled pictures are presented to the youngster in turn, along with a collection of 17 statements indicating possible emotional reactions to the situation portrayed. There is a different list with each picture but the statements are of similar content arranged in a different order. The subject is asked to pick out those which represent his or her feelings about the particular circumstances. The statements refer to a variety of possible reactions such as: loneliness, self-sufficiency, anger, guilt, anxiety, depersonalization, escape into phantasy, and intellectual confusion. The test was given to about 250 boys and girls, mostly aged 11, 12, 13, 14 and 15, who were living either at home or in a child care establishment.

In the opinion of the reviewer, the specialty of child psychiatry needs well-designed tests of proven reliability and validity, appropriately standardized and capable of measuring emotional factors like the psychological effects of separation experiences. It was therefore disappointing to find that the test presented in this book was not one of these.

From the information provided, it is unclear how the subjects were selected. Precise information about even such basic attributes as sex, age, social class, and whether they were at home or in an institution, is not provided. Appropriate reliability studies and attempts at validation are absent. Statistical evaluation is conspicuous by its absence. The relevant literature is not adequately reviewed.

Unfortunately, the statements to which the youngsters were asked to respond were grouped by the author according to a preconceived plan based on his theoretical views. It would have been better to have justified these groupings empirically by correlation and factor analysis. The absence of the actual responses to individual statements makes it impossible for anyone else to analyse the results for him.

To make matters worse, the layout of the book is thoroughly confusing and irritating. What limited information is provided on sampling and research procedure is inextricably mixed with findings and theoretical views. Quotations and case histories are interspersed, and there are many unsupported conclusions.

The author does not appear to have accepted the need to adopt the usual rigorous methods of carrying out a research project. He gave himself away in this regard at several points in the text; presumably this was defensive to avoid the anxiety created by theoretical suppositions not being borne out. His various apologia for not using a more scientific approach were presumably motivated by a process of identification with the aggressor!

The saving grace of the book, however, is that the test design is imaginative and could provide a useful basis for a repertory grid technique.

IAN BERG

Guidance and Counselling in Schools: a Response to Change. PATRICK M. HUGHES. Pergamon, Oxford, 1971, pp. xii + 241. £3.25.

THE ESTABLISHMENT of formalised systems of guidance and counselling in schools is a relatively recent development. The first courses for training school counsellors were established in Britain in 1965 at Reading and Keele Universities: one-year courses designed for teachers with at least five years experience. In this scholarly book, Patrick Hughes, himself in charge of the Reading course, gives a historical account of the developments, both in education and in society in general, which have given impetus to this new role for the teacher.

The book does not deal with the methodology or the skills of counselling, but rather with the principles underlying the counselling movement. Part I discusses vocational guidance, stressing the importance of developmental guidance. Part II, "mainly educational" goes over old ground: selection at 11+, emerging comprehensives, ability and aptitude, teaching and evaluation. Part III, "Personal guidance" systematically reviews the growth of child centred education, and the child study movement, discusses the limitations of counselling and attempts to put personal help into broader perspective. It is this section which should particularly challenge and interest readers of *Child Psychology and Psychiatry*: for example the assertion that "the idea that the emotional and motivational aspects of peoples' lives should be the particular province of the medically trained person is indeed a curious, even bizzarre notion". Hughes feels strongly that it is not enough for schools to make referrals to specialists: those specialists need to go into schools and work with the teachers. In the last section, "Implications for Schools" Hughes pleads for systematic guidance rather than *ad hoc* 'pastoral care'. The final chapter outlines implications for organisation. In discussing liaison with outside bodies, Hughes reminds us of the difficulties which arise in schools with regard to questions of referral (when, why, how), the exchange of confidential information and the "proper use" of a consultant. Research has shown that agency personnel are "unlikely to place their resources at the disposal of schools in the absence of a school link-man on whose judgement and understanding they could rely".

In my own experience, once the link-man has been found, the possibilities for co-operation and mutual support between school and agency are enormous: informal staffroom discussions, specially convened case discussions, a series of group meetings for staff as part of an in-service training exercise—these all enhance what the teacher or the specialist can achieve in isolation. Specialist services cannot possibly see all the disturbed children found in inner-city areas (e.g. Rutter's findings of 17 per cent in Camberwell, London); neither can the teacher cope without support and help. So for readers of this journal perhaps this is the most urgent and practicable message. This is a good book, solid and sound, somewhat expensive, rather heavy going, the points of principle often getting lost among the careful research and documentation. But for the specialist who is interested in education and who is thinking of branching out into schools, it could be a useful link book!

ANNE JONES

Motor Impairment and Compensatory Education. P. R. MORRIS and H. A. T. WHITING. G. Bell, London, 1971, pp. 256. £2.50.

IN THEIR first chapter the authors raise the query as to whether "motor impairment" is the proper term for the disabilities they wish to discuss. They are concerned not only with inadequate performance of motor skills, such as may characterise a range of dysfunction from clumsiness to spasticity or hyperactivity, but also with inadequate reception of environmental cues and hence with inadequate response to such cues. The recurrent themes in their book are, therefore, frequently perceptual in nature; for example, inability to attend to the relevant elements in any situation, distractibility, perseveration and poor integration, including self-integration. Brain damage is seen as the causative factor in only a small percentage of cases of malfunctioning, the impairment in the majority of instances being multi-determined.

To attempt to blend sensation, perception, movement, learning and personality development, to investigate the aetiology of disorders in these areas and to suggest remediation programmes is a formidable undertaking. Existing knowledge is patchy and the multidisciplinary approach essential for adding to it has seldom been adopted. Morris and Whiting do bring together an impressive number of writings (nearly 500 references are given) which are in some way related to their wide-ranging interests. Inevitably, superficiality creeps in. Perhaps inevitably too, the book becomes unbalanced. There are five chapters on motor impairment, its aetiology, its effect on intellectual and social development and its assessment to one on compensatory education.

The latter term is taken to mean the implementation of training programmes to help the perceptual-motor development of children who have been born with inherently less potential than the undamaged and children with normal potential who have been deprived of the environmental stimulation necessary for its realisation. Discussion centres around the educational possibilities of the work of Gesell and Armatruda, Cruickshank, Frostig, Cratty, Kephart and Laban. Considerably more research investigation is required before any one of these programmes can be claimed to be consistently effective. It is interesting that the distinction made by the authors between congenitally impaired or birth-damaged children and environmentally deprived children has not featured in large-scale studies. Perhaps results would have been less conflicting had this been done.

As a source book, this volume is extremely useful and should be on the shelves of all libraries used by students of physical education and education. As a definitive overview or a critical appraisal of an area of common concern to many educators, psychologists and therapists, it is not so successful, perhaps because the authors have tried to do too much or have tried too hard to remain open-minded and impartial.

Alice F. Laing

The Nature of Adolescent Judgment. E. A. Peel. Staples, London, 1971, pp. 184. £2.25.

This book is primarily concerned with the psychological nature of judgment, and its development in adolescence. It records some of the measures that have been devised to investigate the conditions under which such judgments are made, while a good deal of the work reported has been carried out by the author or his students.

The volume consists of eight chapters. It opens with the author giving his views on the importance of adolescent *understanding* and *judgment*, and making clear what he means by these terms. Chapter 2 outlines a scheme for categorizing and analysing judgments and gives examples of material that can be analysed using it. The scheme differentiates between *description* and *explanation*, the former being content dominated, while the latter refers the phenomenon to previous phenomena and independent generalisations. There is an obvious parallel here to Piaget's notions of concrete and formal operational thought. The following chapter deals with the effect of such factors as age, ability, socio-economic background, also the variables within the material provided, on judgment. There then follows, in Chapter 4, a discussion of the process of making a judgment. Peel deals with the role of curiosity and interest, the preliminary exploration of the problem when its main features are discovered and linked with the experience and insights of the thinker (the graveyard of much problem solving), the formulation of hypotheses and the selection of those most suitable, and hypothetico-deductive reasoning. Chapter 5 raises some interesting issues. It is concerned with the adolescent's awareness of the nature of dynamic stability and his ideas of change with time. In order to understand the dynamic balance of forces the individual must be able to negate and rephrase propositions, and handle problems of cancellation and compensation. But in the section which deals with the adolescent's awareness of the conditions of change, the author admits that his discussion is somewhat speculative although extremely important, and with both admissions the reviewer agrees. In the following chapter the issue of the promotion of mature judgment is dealt with. After reference to the work of Suchman, also Covington and Crutchfield, the author outlines the findings of studies made by persons closer to himself. The penultimate chapter deals with concept formation, while the final chapter, of four pages only, summarises much of what has been said earlier.

This is an important work in many ways. It deals with the thinking, the understanding, and the judgment making of adolescents; it is illustrated by material drawn from many subject areas; and covers ground not considered elsewhere. The author's evidence has made clear, what the reviewer and others who have worked in the field have long known, that much curriculum development has ignored adolescent limitations. It is certainly a book for teachers and teachers-to-be. However, readers would also do well to bear the following points in mind. The section (pp. 59–61) needs to be expanded to make clear what the influence of logical, linguistic and semantic elements on adolescent judgment is. Again, the author could have placed the work covered within a wider framework of results. For example, he points out (pp. 134–135) that there are few studies of relational concepts so important in science and the humanities, but he could have indicated that there are now published studies in respect of proportionality, probability and mathematical function. The considerable work of O'Brien on mathematical logic among adolescents came too late for the book, but readers should be aware of the additional evidence provided by him. Peel also points out the difference between generalisation and abstraction, but does not (pp. 146–147) discuss the number of possible levels of abstraction, nor the difference between level of abstraction of a concept and its order. Finally, the author reports that the effect of a training programme designed to improve the quality of judgments produced better results with able than with less able pupils. But he does not consider if the programme induced an analytic set, or increased the level of thinking *per se*. Other studies have not produced such clear cut results. However, these latter comments are not to be seen out of perspective, for this is a valuable book dealing with a vital topic.

K. LOVELL

Abnormality and Normality. The Mothering of Thalidomide Children. ETHEL ROSKIES. Cornell University Press, London, 1972, pp. vii + 347. £5.95.

IN THIS book the author studies the mothering of a group of thalidomide children in Canada. It falls into three parts. First, an introduction, then the experiment and lastly a summary.

The introduction is an interesting account of how Canada planned for the thalidomide children. The Canadian government had warning of the thalidomide disaster from Germany. They planned to develop the present rehabilitation centres for handicapped children to include medical treatment for the thalidomide children. They also decided that the children should be cared for at home, as far as possible, with social work support for the mothers. Medical treatment for the children and support for the mothers seems to have been provided during visits to the rehabilitation centres.

There were 121 children born in Canada in 1961–62 with thalidomide induced deformities. By 1964, 80 children were still alive.

Dr. Roskies carried out her study at the Rehabilitation Institute in Montreal, the largest of the rehabilitation centres.

On first reading the book, the reviewer got the impression that the Canadian government had been extraordinarily generous to the thalidomide children, but in providing a free habilitation programme for the thalidomide children, it seems the Canadians are doing no more than the National Health Service here does for all disabled children. In discussing the habilitation programme, Dr. Roskies makes the point, re-iterated throughout the book, that even the experts had so little knowledge of this type of handicap that long-term programmes were impossible. In the support given to the mothers, the social workers had no experience of the problems of mothers of thalidomide children; faced with the unknown they tended to see their role as helping the mothers to adjust to their children, they saw the mothers' problems in terms of an over-protection-rejection continuum which was largely irrelevant to the real and changing problems of the mothers.

One gets the impression from this introduction that the mothers were not given very much practical help in caring for their children while they were at home. Help was only provided during visits to the R.I.M.

The second part, the experimental study, was carried out with 21 families when the children were aged 3.5–4 years. The mothers and children were seen at the habilitation centre. The mothers attitudes were explored by means of an interview schedule covering the birth of the child, the return home from hospital and the present time. What emerges from the interview schedule is the complexities and changing nature of the problems faced by parents and staff and the parents acceptance of the burden of caring for their handicapped children.

In the final section, the summing up, Dr. Roskie stresses the developmental aspect of the mothering of thalidomide children. Second, Dr. Roskie is critical of the concentration by professional workers on "the mother–child relationship" in analytical terms. She writes "even Freud fed his hungry patient before he analysed him". Dr. Roskies makes a strong plea for realistic help for mothers. She points out that if society expects parents to keep their handicapped children at home, society must make it possible for parents to do this, otherwise they may salve their own conscience by making scapegoats of the parents.

This is a book which should be read by everyone interested in the welfare of handicapped children.

Elspeth Stephen

Human Intelligence. Ed. J. McV. Hunt. Transactions, New York, 1972, pp. 280. $2.95

J. McVicker Hunt has a considerable reputation as a developmental psychologist and especially as an interpreter of Piaget's ideas; his books and papers display a combination of learning and forcefulness that makes them well worth reading by any standard. One would hardly have guessed this from the present collection, which shows every sign of having been rapidly thrown together. Hunt himself contributes only a page and a half of new material, there is no index, and the only real unifying factor is that all the pieces printed appeared originally in *transaction* magazine (this is not a printer's error, the lower case and partial italicising are a feature of its name).

The book's title is misleading; it suggests a comprehensive, even a scientific treatment. What we have instead is a collection of thirteen essays, with titles like "Changing the game from 'get the teacher', to 'learn' "; "How teachers learn to help children fail"; "Of achievement, hope, and time in poverty"; "Rich man's qualifications, for poor man's jobs". The main theme in many of these pieces is that American education is rigged against the poor and against the black; in particular that white teachers discriminate against black children.

Mixed in with the political pieces are one or two superficially more academic and less propagandist contributions. The first is by a geneticist, Jerry Hirsch, and is again much concerned with racial prejudice. "I find no evidence that Darwin had the attitudes we now call racist. Unfortunately many of his admirers, his contemporaries and his successors were not as circumspect as he" (p. 9). One cannot but admire the sleight of hand with which an accusation is planted at the very moment it is being disclaimed. "Circumspect" in that sentence means "Charles Darwin *was* a racist, but was clever enough to get away with it".

One of the contributions that is not grinding away at political axes but is related to the title of the book is that by John Horn, who includes a lucid and interesting account of some of his work on "fluid" and "crystallised" intelligence. Hunt's own reprinted paper also contains much of interest, and the two chapters that deal with "creativity" are by authorities on the topic.

As I hope is already clear, this book can raise mixed feelings. Many of the contributors write in a knowledgeable and lively way, but the overall effect is of bias almost to the point of obsession—perhaps an excusable or desirable quality in political writing; less so in psychological.

H. J. Butcher

Adolescence: A Psychological Perspective. Dorothy Rogers. Wadsworth, California, 1972, pp. x + 236. $4.50.

It is difficult to know whether to describe this as a book about adolescence, or a book about the psychology of adolescence. What people have written on adolescence is carefully garnered—the concepts (in bold), the schools of thought, research, authors, a glossary—but the dynamic quality of adolescence is somehow absent.

This raises a perpetual problem in dealing with adolescence as a theme. Should one distance oneself from the buzz and throb of the adolescent world and coolly enumerate the theories and research about them? Or should one enter the world of the adolescents and see how the theories fit? Thus, the book tells us: "A few of the more popular adolescent activities are watching television and listening to music". True enough. But it might have been fruitful, say, to attempt to analyse the behaviour of adolescents in a discotheque in terms of what we know about their aspirations, stages of growth and developmental strivings. The butterfly, in fact, is pinned out and scrupulously examined, but it is never allowed to fly. We are left with a book rich in information, but with a dimension missing, in spite of a generous, and interesting, scatter of quotations from the adolescents themselves.

A book of this kind has its place and value. It is handy for factual reference. It will give a student the words the initiated use and alert him to the language that examiners expect. It outlines the state of play in the psychology of adolescence. It also offers some illuminating bursts of personal insight. But it is a moot point whether the reader, having made his way through all the compact information offered, will find himself any nearer knowing how to relate to an adolescent. As a teaching manual it would need a good, strong injection of the literature of adolescence as an antidote: such books as *The Diary of Anna Frank*, *The Catcher in the Rye*, *A Kind of Loving* and the rest. The adolescent as a person cannot be understood as the sum of his parts.

James Hemming

J. Child Psychol. Psychiat., Vol. 14, 1973, p. 239. Pergamon Press. Printed in Great Britain.

ERRATA

S. Wolkind and M. Rutter (1973) Children who have been "in care". *J. Child Psychol. Psychiat.* **14** (2), 97–105 (1973).

The Authors wish to apologize for the fact that certain figures in Tables 1 and 3 of their paper were incorrect. The corrected tables are printed below.

Table 1. Psychiatric disturbance and experience of care

	General population control group (excluding deviant children)		Children deviant on teachers' questionnaire (with parental interview)		Children with psychiatric disorder	
	N	%	*N*	%	*N*	%
Isle of Wight						
Children been "in care"	2	(2·2)	12	(12·9)*	6	(16·2)**
Total group	92		93		37	
Inner London Borough						
Children been "in care"	1	(1·3)	15	(10·1)***	12	(18·7)****
Total group	80		148		64	

*Significant difference from control group: $\chi^2 = 6{\cdot}16$, 1 *d.f.*, $p < 0{\cdot}05$

** ,, ,, ,, ,, ,, $\chi^2 = 6{\cdot}69$, 1 *d.f.*, $p < 0{\cdot}01$

*** ,, ,, ,, ,, ,, $\chi^2 = 5{\cdot}00$, 1 *d.f.*, $p < 0{\cdot}05$

**** ,, ,, ,, ,, ,, $\chi^2 = 11{\cdot}21$, 1 *d.f.*, $p < 0{\cdot}001$

Table 3. Estimated total number of children with experience of care

	(a) Total population No.	(b) % of children in total general population control group who have been "in care" %	(a) X (b) Estimated total no. children been "in care"
Isle of Wight	1279	(2·0)	26
Inner London	1689	(3·1)	52

autism educational treatment

tak, Lawrence and Rutter, Michael (1973) Special educational treatment of
stic children: a comparative study—I. Design of study and characteristics of units
hild Psychol. Psychiat. **14**, 161–179.

nmary—Autistic children attending three different special units were followed
over a 3½–4 yr period to assess changes in educational, cognitive, linguistic, social
behavioural status. The régimes in the units varied in the amount of structure and
orientation to educational goals. This paper presents details of the study design,
hods used, and results of an objective examination of staff behaviour in the three
ts. It was possible to demonstrate significant differences in the amount and character
taff interactions with children both between units and between individual staff.

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parents, change agents, children

ohnson, Claudia A. and Katz, Roger C. (1973) Using parents as change agents for
heir children: a review. *J. Child Psychol. Psychiat.* **14,** 181–200.

ummary—The results and procedures of investigators who have used parents as
rimary or auxiliary change agents for their children are reviewed. Deviant child
ehaviors that have been successfully modified by parents are first described. Following
his, methods of parent training are discussed. The third and final section of the paper
deals with some critical methodological issues—data collection, reliability of measurement,
demonstrations of behavioral control, follow-up, and cost-effectiveness factors—
that require routine and more careful consideration before the efficacy of parent therapists
can be adequately assessed. Several recommendations are provided by which to
achieve more definitive analyses of this approach to child treatment. Suggestions for
subsequent research are also briefly discussed.

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attachment, conceptualization

Rosenthal, Miriam K. (1973) Attachment and mother–infant interaction:
research impassés and a suggested change in orientation. *J. Child Psychol. Psychia*
201–207.

Summary—This paper suggests that a change in the conceptualization of attach
is required in order to avoid certain research impassés. In particular, problems a
from work on the "stability" of attachment and on the relationship between its va
"indices" are discussed. Attachment should be viewed as patterns of interaction bet
two human beings and not as a "thing" which *results* from such interactions.
suggested that regarding it as certain characteristics of person–child interaction r
than as a "summary–construct" attributed to a child, may lead to more meani
investigation of the psychological processes involved in attachment.

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affective disorder, relatives
hyperactive children

Stewart, Mark A. and Morrison, James R, (1973) Affective disorder amon
relatives of hyperactive children. *J. Child Phsychol. Psychiat.* **14,** 209–212.

Summary—We determined the incidence of bipolar and unipolar affective di
among the natural relatives of 59 hyperactive children, the "legal" relatives
adopted hyperactive children, and the relatives of 41 control children.
were no significant differences in incidence of the two conditions between the
of relatives, except for a greater incidence of unipolar affective disorder in the com
second degree relatives of hyperactive children than in the relatives of controls.
over, the incidence of bipolar affective disorder in the natural parents of hyper
children was much lower than figures reported for the parents of patients with thi
of affective disorder. Our data do not support the idea that hyperactivity is a
hood form of manic-depressive psychosis.

hyperactivity, sustained attention

s, Donald H., Douglas, Virginia I. and Morgenstern, Gert (1973) Sustained
tion in hyperactive children. *J. Child Psychol. Psychiat.* **14,** 213–220.

mary—The ability of hyperactive children to maintain attention on three tasks
examined. One of the tasks, a Choice Reaction Time Task, measured attention for
f periods, while the other two measured sustained attention. Of the latter two,
was an experimenter-paced task (the Continuous Performance Test) and the other
lf-paced task (the Serial Reaction Task). It was found that the hyperactive children
e no different from their normal controls in their ability to direct their attention for
ef periods. They were, however, significantly inferior to the controls in their ability
ustain attention, particularly on the experimenter-paced task.

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Palmer Scale of Mental Tests (Stutsman, 1948) and the Performance Scale of the Wisc (Wechsler, 1949). These tests were used as alternatives, i.e. if a child could not be assessed on one test, the other was used, the WISC score always being taken if both were available.

As justified by previous findings (Lockyer, 1967; Lockyer and Rutter, 1969), the Merrill–Palmer Scale was used for children whose chronological age was above the ceiling of the test but whose mental age was within the appropriate test limits. In 1967, 42 of the children were tested on the Merrill–Palmer Scale (omitting verbal items) and 8 on the WISC, but at follow-up only 17 were test on the Merrill–Palmer Scale whereas 33 were assessed on the WISC. The reason for the difference lies in the fact that the former test is appropriate up to a mental age of about 5½ yr whereas the WISC is only usable at a mental age above that level. At follow-up the children's mental age, as well as their chronological age, had risen. There are problems in the intellectual assessment of autistic children, but provided the testing is carried out appropriately, the scores have been shown to be reliable and to have predictive validity (see Lockyer and Rutter, 1969 and Berger and Yule, 1972 for both the issues and findings).

TABLE 1. MERRILL–PALMER AND WISC COMPARISONS*

	Test given in 1967 Mean I.Q.	Inter-test *r*	Test given in 1971 Mean I.Q.
M–P 1967 and 1971 (*n*=17)	38·5	0·89	32·1
M–P 1967 and WISC 1971 (*n*=25)	63·9	0·74	62·4
WISC 1967 and 1971 (*n*=8)	82·5	0·97	82·5

*None of the 1967–1971 differences between means or those between inter-test correlations is statistically significant.

Strictly speaking, the WISC and Merrill–Palmer Scales cannot be regarded as directly equivalent and hence their combination in this study requires justification. Whatever may be the situation with normal children, previous studies have suggested that, in autistic children, scores on the two tests are closely comparable (Lockyer, 1967; Lockyer and Rutter, 1969). Their equivalence was directly tested with respect to the children in the present sample (see Table 1). There were 25 children tested on the Merrill–Palmer Scale in 1967 but who were assessed on the WISC in 1971. In spite of the 3½ yr gap between testings, the product–moment correlation between the scores was 0·74; this correlation is not significantly less than that when the same test was used on both occasions. The I.Q. was used to predict the children's attainments in reading, arithmetic and other functions (see below), and as the correlation between the WISC and Merrill–Palmer Scales fell short of unity it was still possible that the two tests might vary in their associations with these variables. This was checked by comparing the correlation between the 1967 Merrill–Palmer I.Q. and each predicted variable with the corresponding correlation using the 1971 WISC I.Q. This analysis was again based on the data from the same 25 children. In no case were there significant differences between the two sets of correlations, indicating that for these purposes the WISC and Merrill–Palmer could be taken as measuring comparable functions.

However, at least as important in the present context is the finding that the *level* of I.Q. was also closely similar on the two tests. The mean I.Q. on the Merrill–Palmer scale in 1967 was 63·9 and on the WISC in 1971 it was 62·4. The consistency in level also applied when the same test was given on both occasions but obviously (because of the mental age requirements of the tests) the mean I.Q. was lower for children who were never able to score on the WISC and was higher for those who could be tested on the WISC from the outset. It may be concluded that in this group of children the Merrill–Palmer and WISC I.Q.s were comparable and could safely be treated as equivalent.

(ii) *Language*. At the outset of the study, the English Picture Vocabulary Test (Brimer and Dunn, 1963) was used to provide a measure of vocabulary comprehension. In addition, for those children who could speak, tape recordings were made of a speech sample obtained from the child in a standardised free play situation with the tester who showed pictures and toys to the child and tried to get the child to speak as freely as possible.

(iii) *Social behaviour*. This was assessed through rating scales based on direct observation of behaviour in the classroom, the test situation, and at play, and by interviews and questionnaires with parents regarding behaviour patterns at home.

(a) *Classroom*. Classroom behaviour was assessed through time sampling by building up a series of 15 sec observation periods in each of which the child's behaviour was described as on-task, stereotypy, other irrelevant activity, looking around the room, moving around the room or unoccupied. For each observation period, only one activity could be rated. Sixty observations were made for each child.

(b) *Test situation*. This was the same situation as that in which tape recordings of speech were made. At the conclusion of the period, the child was rated on a checklist of social behaviours. Each behaviour was rated as marked, slight or absent and scored "2", "1" or "0 "respectively. Two scales were constructed from behaviours so rated. The first, designed to assess *social responsiveness* included taking adult's hand to objects as the sole indication of what the child wanted, gaze avoidance, lack of variation in facial expression, physical withdrawal of the child away from the adult and absence of co-operative play with the adult. Scores were summed to yield a maximum of 10 so that a high score indicated low social responsiveness. The second scale was designed to assess *deviant behaviour* and included temper tantrums, self-injury, facial grimaces and hand or finger stereotypies. These items yielded a maximum score of 8, a high score indicating a high level of deviant behaviour.

(c) *Play situation*. Play was time-sampled through a series of 15 sec observation periods in each of which the child's behaviour was described as unoccupied, solitary, onlooker, parallel or co-operative. For each observation period, only one activity could be rated. Twenty observations were made for each child.

(d) *At home*. Social behaviour at home was assessed from systematic information supplied by parents, through interviews in the first year of the study and by questionnaire at the end. Three scales were constructed. The first, designed to assess *social responsiveness* in the home included joining in the play of other children, normal facial expressiveness, meeting adult gaze normally, presence

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(d) *At home*. Social behaviour at home was assessed from systematic information supplied by parents, through interviews in the first year of the study and by questionnaire at the end. Three scales were constructed. The first, designed to assess *social responsiveness* in the home included joining in the play of other children, normal facial expressiveness, meeting adult gaze normally, presence of constructive (non-repetitive) self-initiated play, and having a particular friend. All of these items, except that dealing with gaze, were scored "2" for normal behaviour, "1" for slight abnormality and "0" for complete absence of the behaviour. The gaze item was rated as "1" for normal gaze and "0" for gaze avoidance. This yielded a total score of 9, so that a high score indicated the most normal social responsiveness (i.e. in the opposite direction to the other behaviour scales).

A second group of items were used to assess *social handicap* resulting from the child's disruptive behaviour. These items concerned activities which were avoided by the parents. The activities included visiting a friend, or relation having a visitor at home, going shopping, going on bus or train, going to a café or restaurant, going to an hotel or guest house, and going to a cinema or theatre. A score of "1" was given for each situation avoided so that a total score of 7 was obtainable, a high score indicating severe social handicap.

A third group of items was assembled to assess degree of *deviant or abnormal behaviour*. These (scored "1" each) included stereotypies, obsessional rituals, tantrums, waking during the night, running away from parents when out, undoing clothing in public and self-injury. This scale yielded a total of 7, a high score indicating high degree of deviant behaviour.

(iv) *Educational attainment*. Children were assessed on reading and on arithmetical skills. Reading was assessed with the Neale Analysis of Reading Ability (Neale, 1966), yielding scores expressed as reading ages for accuracy, rate and comprehension. Where children could not score on this test, they were tested for ability to read individual lower case letters of the alphabet. Score was expressed as number of letters covered.

Arithmetical skills were assessed at the outset of the study with the Staffordshire Arithmetic Test (Hebron, 1958) and with tests of the child's ability to count objects and to name digits where he could not score on a formal test. However, the decimal conversion of currency during the course of the study invalidated the use of the Staffordshire Test (and most other tests) at follow-up. Accordingly, a scale was constructed in which points were allotted for ability to carry out each of a graded series of arithmetical operations and the child was given a score on the basis of his demonstrated skill. The scale yielded a total of 32 points and ranged from items like identifying 5 or more digits, counting 5 or more objects, adding single figure numbers (1 point each) up to solving problems involving fractions (2 points), doing algebra (3 points) and doing geometry (3 points). The full scale is included in appendix 1.

3. FOLLOW-UP RESULTS: OVERALL PROGRESS

Behaviour in the unit

Children's behaviour when they were supposed to be engaged in some task was time-sampled. During each 15 sec period a rating was made according to what the child was mainly doing during that 15 sec (see Fig. 1). Each child in each unit was systematically observed for 60 such periods. For this purpose, children who had been transferred to other units during the course of the study were excluded.

At Unit *A* most of the time was spent engaged in stereotypies, irrelevant activities, doing nothing or just looking and moving around. For only 29 per cent of the time

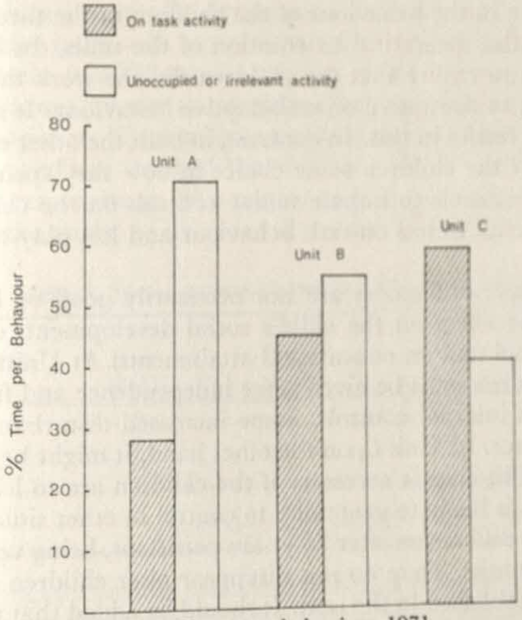

FIG. 1. Classroom behaviour 1971.

were the children engaged in whatever activity they were supposed to be doing. In contrast, at Unit *C* the ratio was the other way round. Only 41 per cent of the time was unoccupied or spent on irrelevant activity, whereas for 59 per cent of the time the children were doing the task given to them. Unit *B* was intermediate in this respect. ($\chi^2 = 100 \cdot 7$; 2 *d.f.*; total $n = 2{,}160$; $p < 0 \cdot 001$).

TABLE 2. BEHAVIOUR IN FREE PLAY SITUATIONS (1971)

	Units		
	A (%)	*B* (%)	*C* (%)
Unoccupied	26	32	34
Solitary	64	61	44
Onlooker	6	5	5
Parallel/co-operative	5	2	17*

*($\chi^2 = 69{\cdot}07$; 6 *d.f.*; total $n = 1000$; $p < 0{\cdot}001$). In this and other tables in the paper Yates correction was applied where appropriate in the calculation of chi-square.

This difference in classroom behaviour, where the children were directly under the instruction and supervision of staff, was paralleled by differences in an undirected free play situation (based on 20 15-sec time samples per child). In Unit *C*, 17 per cent of the time was spent in parallel or cooperative play compared with only 5 per cent in Unit *A* and 2 per cent in Unit *B* (Table 2). Nevertheless, it should be noted that in all three units the children spent a very high proportion of their time unoccupied or engaged in solitary activities.

These differences in the behaviour of the children in the three units are striking and closely reflect the theoretical orientation of the units. In Unit *C* there was a continuous concern to ensure that the children did the work that they were given and did not engage in disruptive or maladaptive behaviour. It seems that the staff were reasonably successful in this. In contrast, in both the other units it was thought therapeutic to allow the children some choice in how they spent their time and it was considered undesirable to impose undue controls on the children's behaviour. This appeared to result in less on-task behaviour and less play together with other children.

Nevertheless, these differences are not necessarily good or bad in themselves. What matters is the effect on the child's social development, on his behavioural control outside school and on educational attainments. At Units *A* and *B* it might be argued that children must be given some independence and freedom of choice if they are to develop internal controls. Some increased disturbance in the unit is a necessary consequence. At Unit *C*, on the other hand, it might be claimed that strict behavioural control in class is necessary if the children are to learn effectively and that control in class is likely to generalise to control in other situations.

These inter-unit differences after $3\frac{1}{2}$ yr are persistent, being very like those found after the first 20 months. They do not disappear after children have settled down and become well established in the unit. It should be added that the differences also probably emerge very rapidly. We have few systematic data but it appears that the behavioural control of children at Unit *C* is usually established after just a few weeks or at most a few months. Control seems to be a direct response of the child to the milieu of the unit rather than a control which is gradually built up through changes in the child himself. Alternatively, the control is brought about by the type of staff behaviour first encountered in the unit but then fails to develop further because of differences in staff behaviour in later classes.

Behaviour at home

TABLE 3. DEVIANT BEHAVIOUR IN 1968 AND IN 1971

	1971			
1968	Slight deviance (0–2)	Moderate deviance (3–4)	Marked deviance (5–7)	Total
Slight deviance (Score 0–2)	11	0	0	11
Moderate deviance (Score 3–4)	9	10	1	20
Marked deviance (Score 5–7)	1	10	8	19
Total	21	20	9	50

$\chi^2=30\cdot61$; 4 *d.f.*; $p<0\cdot001$

The children's behaviour outside the school situation was assessed on the basis of systematic reports from parents. These showed that in the group as a whole there had been a general reduction in the amount of deviant behaviour, ($t=6\cdot17$; 49 *d.f.*; $p<0\cdot001$), and a general increase in the children's social responsiveness ($t=8\cdot06$; 49 *d.f.*; $p<0\cdot001$). These results are shown in Tables 3 and 4. In 1968, $\frac{2}{5}$ of the children were markedly deviant and only $\frac{1}{5}$ slightly deviant. By 1971, this ratio had reversed with less than $\frac{1}{5}$ markedly deviant and more than $\frac{2}{5}$ only slightly deviant. This means that behaviours such as stereotypies, rituals and self-injury had become less frequent. Similarly, in 1968 only 14 per cent of the children showed good social responsiveness (as shown by eye to eye gaze, play and facial expression, etc.) but by 1971 54 per cent did so. These tables also show that on both measures, there was a fair degree of consistency amongst the children. Those children who were most disturbed and least responsive in 1968 tended to be more disturbed and less responsive at the end of the study.

TABLE 4. SOCIAL RESPONSIVENESS IN 1968 AND IN 1971

1968	1971 Poor (0–1)	Fair (2–3)	Good (4+)	Total
Poor (0–1)	5	11	6	22
Fair (2–3)	2	5	14	21
Good (4+)	0	0	7	7
Total	7	16	27	50

$\chi^2=11{\cdot}31$; 2 *d.f.*; $p<0{\cdot}01$

Unlike the findings for on-task behaviour and play at school, there were no differences between units on either deviant behaviour or social responsiveness as reported by parents. Tables 5 and 6 show the findings in terms of amount of improvement. This was judged in terms of the difference in score for each child between the measures in 1968 and those in 1971. These results show that there are no significant differences between the three units in either measure.

TABLE 5. IMPROVEMENT IN SOCIAL RESPONSIVENESS 1968–71

Improvement	Units *A*	*B*	*C*	Total
None/little (−2 to +1)	4	7	8	19
Moderate (+2 to +3)	4	8	9	21
Marked (+4 or more)	0	3	7	10
Total	8	18	24	50

$\chi^2=0{\cdot}76$; 2 *d.f.*; *N.S.* (combining moderate/marked improvement)

TABLE 6. IMPROVEMENT IN DEVIANT BEHAVIOUR 1968–71

Improvement	Units *A*	*B*	*C*	Total
None (−3 to 0)	4	3	9	16
Slight (+1)	3	9	6	18
Moderate (+2 or more)	1	6	9	16
Total	8	18	24	50

$\chi^2=3{\cdot}43$; 2 *d.f.*; *N.S.* (combining slight/moderate improvement)

Behaviour in the test situation

Similar measures were made with respect to the children's behaviour during the test situation. Over the total sample, 61 per cent of the children increased in social responsiveness by a score of 2 points or more ($t=9 \cdot 38$; 49 *d.f.*; $p<0 \cdot 001$). But, as with the scale based on parental reports, there were no significant differences between units in the proportion of children showing increased social responsiveness.

The test situation gave only limited opportunities for the children to exhibit deviant behaviour, and a third of the children showed none of the scored deviant behaviours during the test period. Among the remainder, just over half (58 per cent) showed decreased deviance at the 1971 follow-up, compared with their score in 1968. ($t=4 \cdot 09$; 49 *d.f.*; $p<0 \cdot 001$). However, there were no significant differences between units in this respect.

These findings, together with those based on parental information, show that although most children in all three units had improved appreciably in their behaviour and social relationships, the units did not differ in this respect. This stands in contrast to the inter-unit differences in scholastic attainment and classroom behaviour. This lack of inter-unit differences in the children's behaviour outside the units suggests that the improvements while at the units often failed to generalise to other situations. This is in keeping with the view that the behavioural control of the children while at the units is a fairly direct response to the specific milieu, rather than a reflection of any more pervasive or basic improvement in the children.

Speech

TABLE 7. SPEECH IN CHLIDREN AGED 10 yr OR MORE IN 1971

Speech	Units *A*	*B*	*C*	Total
None or single words only	3	7	5	15
Phrases used to communicate	4	9	17	30
Total	7	16	22	45

$\chi^2=2 \cdot 18$; 2 *d.f.*; *N.S.*

Table 7 shows the findings for the children's speech at follow-up. In order to increase the comparability between units, in this and all following tables, attention is confined to children aged at least 10 yr in 1971 (unless specified otherwise). In Unit *C* most of the children were using phrases or sentences to communicate whereas in Units *A* and *B* only half the children were doing so. The remainder were without speech or were using single words. Similar differences between units are apparent if changes in speech are considered. Of the 9 children at Unit *C* who were initially without speech, 4 gained phrase speech during the follow-up period. This happened with 2 of the 9 speechless children at Unit *B* and none of the 3 at Unit *A*.

Scholastic attainments

As with competence in speech, scholastic attainments were greater in the children from Unit *C* than in either of the other two units. Attainments in arithmetic, reading accuracy and reading comprehension were examined. As with speech, attention was confined to children aged 10 yr or more.

Arithmetic. Children's arithmetical skills were classified as "none" (not able to count with any appreciation of number), "simple only" (counting, arithmetical

TABLE 8. ARITHMETICAL SKILLS IN CHILDREN AGED 10 yr OR MORE IN 1971

	Units			
	A	*B*	*C*	Total
No skills	3	8	2	13
Simple skills only (e.g. counting)	3	6	7	16
All four basic skills (with double figure numbers)	1	2	13	16
Total	7	16	22	45

$\chi^2 = 12{\cdot}85$; 2 *d.f.*; $p < 0{\cdot}01$

manipulation with single figure numbers only) or "all four basic skills" (i.e. the child could add, subtract, divided and multiply with double figure numbers). Two thirds of the children at Unit *C* were able to use all four processes with two figure numbers, whereas only 2 out of 16 children at Unit *B*, and only one of the seven children at Unit *A*, could do so (Table 8). Of the 16 children who had all four basic skills, 8 could apply these processes to problems requiring the child to decide which process to use as well as to carry out the mechanical operation. All 8 children were at Unit *C*. Altogether, a third of the autistic children (pooling the three units) had mastered the four basic arithmetical skills but a third had no arithmetical skills of even the simplest kind.

Reading accuracy. Reading accuracy was examined on the Neale Analysis of Reading Ability. Just over half the Unit *C* children had a reading age of 8 yr or more compared with only one of the 16 Unit *B* children and none of the Unit *A* children (Table 9). Nearly half the autistic children scored below the lower limit of the test. Most of these were at Units *A* and *B*.

The Neale test measures the child's ability to read a piece of prose. Some of the children who could not score on this task could read isolated words on flash cards although they were unable to apply this skill to reading a short paragraph of a simple story. This emphasises a problem common to many autistic children, namely that they can learn something in one context but they have great difficulty in applying it to another. Other findings indicate that they also have considerable difficulty in *understanding* what they learn. Much is learned by rote.

Reading comprehension

This is illustrated by the findings for reading comprehension which are shown in Table 10. Again, the children in Unit *C* did better than those in either of the other

TABLE 9. READING ACCURACY IN CHILDREN AGED 10 yr OR MORE IN 1971

	Units			
Neale reading age	*A*	*B*	*C*	Total
Below lower limit of test	5	13	4	22
R.A. below 8 yr	2	2	6	10
R.A. 8 yr or more	0	1	12	13
Total	7	16	22	45

$\chi^2 = 16{\cdot}43$; 2 *d.f.*; $p < 0{\cdot}001$

two units. However, it is just as important to note that out of the whole group of 45 children, only two had a reading comprehension age of 8 yr or better. One of these children was at Unit *B* and 1 at Unit *C*. The comprehension section of the Neale test requires the child to answer simple questions about what he has read immediately before. This is a difficult test of comprehension in view of the children's language disabilities. Even so, it indicates that in children with reasonable skills in mechanical reading, understanding of what is read lags well behind.

TABLE 10. READING COMPREHENSION IN CHILDREN AGED 10 yr OR MORE IN 1971

	Units			
Neale reading age	*A*	*B*	*C*	Total
Below lower limit of test	7	13	7	27
R.A. below 8 yr	0	2	14	16
R.A. 8 yr or more	0	1	1	2
Total	7	16	22	45

$\chi^2 = 14 \cdot 96$; 2 *d.f.*; $p < 0 \cdot 001$

Progress in adolescence

Many autistic units do not cater for children after the age of 10–12 yr, so special attention was paid to the progress of children during the adolescent period. There were 5 children (all at Unit *C*) who were aged at least 12 yr at the start of the study, and so at least 16 yr at the time of final follow-up. In keeping with the younger children, modest scholastic progress continued during the adolescent years. The mean reading accuracy age rose by 6½ months to 9·3 yr and the mean reading comprehension age rose by just over 4 months to 7·0 yr. However, there was wide individual variation and one boy gained 23 months in reading accuracy and 12 months in comprehension. The overall gains in arithmetic were much greater. The mean score rose from 13·2 to 21·8. In practice, this means that at the start of the study, the children could add, subtract and multiply but not divide, whereas at the end they were able to solve problems involving addition and subtraction and solve some involving multiplication. This is a very useful increase in arithmetical competence as it involves the crucial transition from rote mechanical skills to the ability to apply the skills to simple everyday life problems. One boy achieved an "O" level grading on one C.S.E. subject at age 16 yr and another boy passed two C.S.E. subjects at age 18 yr. As it is highly unlikely that any of these 5 children could have been accepted into schools other than autistic units, their scholastic progress indicates the value of units catering for adolescent autistic children.

Transfers

During the course of the study about a third of the children transferred to other schools or units (Table 11). In two cases this involved a transfer to another autistic unit, and in 5 cases it meant that the children were moved to a training centre, now called E.S.N. (severe), or to a subnormality hospital. In addition, 2 children at Unit *C* were separated from the rest in a class for slow-learning children. However, 8 children transferred to a more normal school environment. Four of these went to a special school for educationally subnormal (E.S.N.) or maladjusted children and

TABLE 11. TRANSFERS DURING THE FOLLOW-UP PERIOD (CHILDREN AGED 10 yr OR MORE IN 1971

	Units			
	A	*B*	*C*	Total
Normal school	1	1	2	4
E.S.N./maladjusted	1	3	0	4
Another autistic unit	1	1	0	2
Training centre	0	1	1	2
Subnormality hospital	0	3	0	3
Total	3	9	3	15

4 went on to normal schools. All the children held their places in the new schools but most showed a disturbing but transient deterioration in behaviour just after transfer. This problem is discussed further below.

4. CHILD CHARACTERISTICS AND EDUCATIONAL PROGRESS

A study was made of how the children's characteristics at the start of the study predicted their progress over the next 4 yr and their attainments when finally followed-up in 1971. As expected, the child's initial level on any particular measure correlated with his final score on that measure. Positive but generally low correlations were obtained between various of the children's characteristics and the outcome measures. However, in keeping with previous studies, the child's I.Q. proved to be the best single predictor of educational and social progress. The I.Q. score in 1967 correlated $+0\cdot42$ with reading accuracy at follow-up, $+0\cdot33$ with arithmetic score, $+0\cdot59$ with on-task behaviour in the unit, $+0\cdot32$ with social responsiveness, $+0\cdot43$ with deviant behaviour and $+0\cdot48$ with social handicap.

A score on the Merrill–Palmer Scale or WISC was obtainable for nearly all the autistic children and this score proved to be highly reliable and stable over time. The I.Q. in 1967 correlated $+0\cdot91$ with the I.Q. as obtained in 1971, 3½–4 yr later.

These correlations show the importance of the I.Q. score as a predictor of the extent of the children's scholastic and social progress. The I.Q. was also found to be important as a predictor of whether there would be any reasonable scholastic progress over the course of the 4 yr follow-up period, as shown in Table 12 which gives the findings for reading improvement.

Reading improvement was defined as a Neale reading accuracy score which was at least 3 months higher in 1971 than it was in 1967, or a scorable response in 1971 there having been no score in 1967, or a gain of at least 6 letters over the first testing. In effect, improvement was almost any recordable gain in reading skills over the course of 4 yr. Of the 31 children with an I.Q. of 50 or more, 29 (87 per cent) made

TABLE 12. READING IMPROVEMENT AND I.Q.

I.Q.	Not improved	Improved	Total
49 or less	17	2	19
50 or more	4	27	31
Total	21	29	50

$\chi^2=25\cdot30$; 1 *d.f.*; $p<0\cdot001$

some improvement. In sharp contrast, only 2 (11 per cent) of the 19 children with an I.Q. less than 50 did so. In fact, an I.Q. of 44 was found to provide the best discrimination. *None* of the 16 with an I.Q. below that level showed any improvement in reading whereas all but 5 of those with an I.Q. of 44 or more made gains. These results suggest that I.Q. not only predicts how *much* a child is likely to gain in reading skills (as shown by the correlation coefficient), but also whether he will learn at all (as indicated by the cut-off).

The I.Q. was also found to predict speech development. Of the 21 children without phrase speech in 1967 and aged at least 10 yr in 1971, 6 gained speech during the course of the study. These 6 children had a mean I.Q. of 66·8 compared with a mean I.Q. of 44·1 in the remaining 15 children who were still without phrase speech at the end of the investigation ($t=2{\cdot}24$; 19 *d.f.*; $p<0{\cdot}05$). The mean I.Q. of the 24 children who had phrase speech from the outset was similar (65·5) to that of the children who gained speech during the study.

These findings must be taken into account in any comparison of the three units. Although the children in each unit were roughly similar in age and ability, there was a tendency for Unit *C* to have fewer children with really low I.Q. As this could have influenced inter-unit comparisons, it was necessary to take I.Q. into account in some way. Regression analysis was used for this purpose, as this has been shown to be the most appropriate technique to equate groups which differ in some respect (see Thorndike, 1963, for a full and clear discussion of the issues involved).

5. FOLLOW-UP: REGRESSION ANALYSIS FINDINGS

Regression analysis

Regression analysis is a statistical technique which allows one to predict a child's score on any particular test, as judged from his score on some other test, on the assumption that he is exactly average for the group of which he forms a part (Thorndike, 1963). In order to utilise this procedure it is first necessary to determine the most important predictor for each variable to be considered. This was done by examining the correlations between the various relevant background characteristics and the outcome variable to be studied. Following this analysis, it was found that I.Q. was the most important predictor for the majority of outcome measures included in the study. Accordingly, I.Q. had to be included in the regression equation together with any other variables which showed a sizeable correlation on the outcome measure. The procedure may be illustrated by reference to reading accuracy where the correlation with I.Q. was +0·42. Age, too, of course influenced the reading accuracy score. In the total group of autistic children, age correlated +0·38 with the reading accuracy score at follow-up. On the basis of these correlations, together with the average scores for each variable, it is possible to calculate an equation which predicts the reading accuracy score for each child.* The equation is:

$$\begin{array}{l}\text{Predicted reading accuracy}\\ \quad\text{score in 1971}\end{array} = 0{\cdot}566 \times (\text{I.Q. in 1967}) + 0{\cdot}393 \times (\text{age in 1967}) + 4{\cdot}252.$$

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*In order to use this procedure it is first necessary to ensure that the regressions are linear and the correlations are similar in each of the three units. This was done in each case before proceeding to use any equation.

The next stage is to work out the predicted score for each child and compare it with his actual score. In this way, it can be worked out whether an individual child is doing better or worse than expected. An extension of this is to calculate whether, overall, the children in one unit do better or worse than expectation, and so compare units. Such a prediction, or course, cannot indicate real "capacity", or what a child "should" achieve in optimal circumstances. All it can do is indicate how a child stands in relation to other children in the group—the group for this purpose being the autistic children in all three units.

Figure 2 gives the findings for reading accuracy as measured on the Neale test. Calculations were based upon the 34 children for whom scores on reading accuracy could be obtained.* The group was made up of 4 children from Unit *A*, 8 from Unit *B* and 22 from Unit *C*. Computation of predicted and obtained reading ages showed that at Unit *A*, the mean reading age was 1 yr 4 months below that expected on the basis of the children's age and I.Q. At Unit *B*, the mean discrepancy between obtained and predicted reading ages was some 9 months below expectation, whereas at Unit *C* the children read, on average, 5 months better than prediction. The differences between Unit *C* and each of the other units (considered separately) are both statistically significant at the 5 per cent level. These results indicate that even after taking into account the children's own characteristics at the start of the study, the average reading achievement was significantly better at Unit *C* than at either of the other two units.

($t=2\cdot40$ for C/A, 24 *d.f.*, $p<0\cdot05$; $t=2\cdot56$ for C/B; 28 *d.f.*, $p=0\cdot02$).

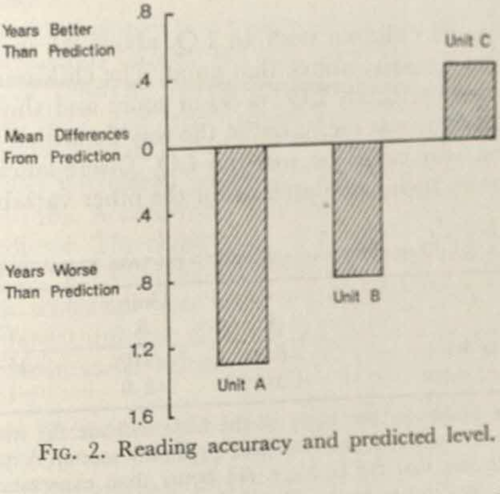

FIG. 2. Reading accuracy and predicted level.

Arithmetical skills

An equation predicting arithmetic scores was calculated for the same group of children in the same way. As for reading accuracy, the mean discrepancies between

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*Because this analsyis and that for arithmetical skills omitted the most intellectually retarded children without attainment scores (most of whom were at Units *A* and *B*), the original inter-unit differences in I.Q. no longer applied. The mean I.Q. for Unit *A* children included in this analysis was 71, for Unit *B* children it was 66 and for Unit *C* children it was 70 (no differences statistically significant).

actual and predicted arithmetic scores were calculated for each unit. Again, Unit *C* children did better than expected whereas those at Unit *A* and Unit *B* did worse. The mean achievement at Unit *C* was significantly better (at the 5 per cent level) than that of either Unit *A* or Unit *B*.

($t=2{\cdot}43$ for C/A, 24 *d.f.*, $p<0{\cdot}05$; $t=2{\cdot}64$ for C/B, 28 *d.f.*, $p<0{\cdot}02$).

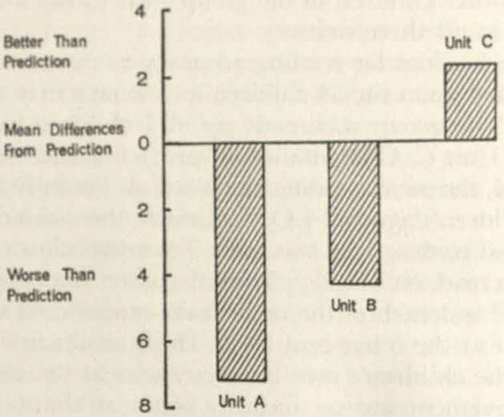

FIG. 3. Arithmetical achievement and predicted level.

Classroom behaviour

For this comparison, all children with an I.Q. above 80 were excluded, as the regression departed from linearity above that point. The children in each unit were then subdivided into those with an I.Q. of 50 or more and those with an I.Q. of 49 or less. On task behaviour was measured in the way described above. In this case the regression equation was based on just the I.Q. Discrepancies between actual and predicted scores were then calculated as for the other variables.

TABLE 13. OBSERVED AND PREDICTED ON-TASK BEHAVIOUR

	Units		
	A	*B*	*C*
I.Q. 49 or less	−0·9*	−3·2	+15·8
I.Q. 50 or more	+3·6	−2·0	−1·0

*The figures in the body of the table indicate the mean discrepancy between observed and predicted scores. A plus sign indicates that the children did better than expectation; a minus sign means worse. (For I.Q. 49 or less, $t=2{\cdot}32$ for C/A, 8 *d.f.*, $p<0{\cdot}05$; and $t=2{\cdot}41$ for C/B, 12 *d.f.*; $p<0{\cdot}05$).

There was no significant differences between the units for the children with an I.Q. of 50 or more, but for the lowest I.Q. group the children at Unit *C* did significantly better than expectation at the 5 per cent level. That is, the children at Unit *C* with an I.Q. of 49 or less showed more on-task behaviour than did the children at either of the other two units. The meaning of this finding is clarified by considering the mean on-task scores for the higher and lower I.Q. children on each of the three units.

For the higher I.Q. children in all units on-task behaviour was present in about 40 of the 60 time samples (just above 40 at Unit *A* and just below 40 for Units *B* and *C*). In Units *A* and *B* the frequency of on-task behaviour for the low I.Q. children was about half that figure (i.e. 18–19 out of 60). In contrast, at Unit *C* there was no difference in on-task behaviour between the two I.Q. groups—both ran at about 40 out of 60 time samples. These results suggest that children with an I.Q. or 50 or more have quite high levels of on-task behaviour more or less regardless of the type of unit. As shown the extent to which this leads to learning is dependent on the unit but that is another matter. With children of I.Q. less than 50, however, there is a general tendency for there to be low rates of on-task behaviour, but this is modifiable by the structure of the environment, as shown by the Unit *C* findings.

This finding is important, as it demonstrates the relevance of the type of unit for low I.Q. as well as for relatively high I.Q. children. The child's I.Q. as already demonstrated, has an important influence on his later scholastic accomplishments. Very few children with an I.Q. below 50 made any useful progress in the traditional three "Rs" and none with an I.Q. below 44 had. Accordingly, the main *scholastic* advantage associated with Unit *C* was found with children whose I.Q. was 50 or greater. The finding with regard to on-task behaviour suggests that the main *behavioural* advantage lay with those whose I.Q. was below 50.

Social behaviour at home

Parental information was used to test whether this apparent advantage generalised to the children's behaviour outside the school situation. The previously described scales covering *social handicap*, (going shopping, visiting, etc.), *deviant behaviour* (stereotypies, rituals, etc.), and *social responsiveness* (friendships, play with children, eye to eye gaze, etc.) were used.

All of these scales correlated positively with I.Q. (with correlations ranging from +0·32 to +0·48). Accordingly, a regression analysis was again carried out using I.Q. as a predictor. The children in each unit were split, as before, into those above and below I.Q. 50. No significant differences were found between the three units on any of these scales nor were there any notable trends, the very minor differences favouring different units on different scales. Although all children had made considerable progress in social behaviour, there were no differences between units in this respect.

It has previously been found that some autistic children deteriorate in adolescence (Rutter, 1970). As the 5 children aged 12 yr or more at the start of the study were all at Unit *C*, the analysis was repeated omitting these children to check whether their inclusion might have distorted the findings. The results of the reanalysis were closely similar to those for the total group.

Weekly boarders at Unit C

About half the children who were weekly boarders at Unit *C*, boarded because they lived too far away to travel to the unit daily. The other half boarded because of their family situation. Residential schooling is often recommended as preferable to day school on the grounds that it provides a greater opportunity for the school to have a beneficial effect on the children's development. Accordingly the behaviour and social development of boarders and day pupils at Unit *C* were compared using the same regression techniques already described. There were no differences in terms of on-task behaviour in the classroom or social responsiveness. However, there was a significant tendency for the boarders to show more deviant behaviour at home ($t=2\cdot73$; 14 *d.f.*; $p<0\cdot02$) and to produce greater social handicap ($t=2\cdot23$; 14 *d.f.*; $p<0\cdot05$). It would be unwise to conclude that these findings indicate that weekly boarding leads to worse behaviour as a few of the children boarded just because the parents could not cope with their disturbed behaviour. However, the findings show that weekly boarding was definitely *not* associated with behavioural improvement *at home* in the group as a whole. Individual children often benefited from admission to the boarding department, particularly with respect to their behaviour while at school. In some children this was also associated with improvements at home but the findings suggest that this was not generally the case.

6. IMPLICATIONS OF FINDINGS

Three other studies have attempted to compare different therapeutic approaches to autistic children. Goldfarb *et al.* (1966) contrasted day and residential care in a group of "schizophrenic" children not all of whom were necessarily autistic. The groups were appropriately matched but no assessment was made of what treatment was involved in the two settings. Wenar *et al.* (1967) provided some evaluation of each of the three milieus they studied (custodial institution, state institution with an active therapeutic programme and a psychoanalytically oriented day care unit), but the findings were limited by the failure to control for initial differences in the children. Ney *et al.* (1971) used a controlled cross-over design to compare the efficacy of operant conditioning and play therapy over a 3 month period. This study did not examine longer-term benefits and suffers from the use of inexperienced therapists. In view of these various limitations and differences from the present study, no attempt will be made to compare findings.

Five key questions were posed in planning the study so that conclusions will first be addressed to these.

6. 1. *How much educational progress can be made by autistic children?*

Qualified optimism is called for with regard to the value of education for autistic children. In all three units, nearly all of the children had been rejected by other schools as unmanageable. Records show that at the time of admission to the units (prior to the start of the study) most of the children were mentally retarded, socially unresponsive and showed marked behavioural disturbance. Because of this they posed severe difficulties to the autistic units which accepted them. In spite of these handicaps the children generally had made considerable social, behavioural and scholastic progress. By the end of the study, two thirds of the children were using phrase speech to communicate, most had developed quite a fair degree of social responsiveness, deviant behaviours were less marked, a third of the children were reading at the 8 yr level or better and a third had acquired all four basic arithmetical skills. Even among the mute children, many had learned to speak and were making progress in other ways. Moreover, a substantial number of children had been able to leave the autistic units and receive education in a more ordinary environment. Two of the oldest children had sat and passed C.S.E. examinations. It should be added that these results apply to children most of whom have still got several years of schooling yet to come, so that the findings are by no means the end-product of education. Further progress is to be expected. It may be concluded that the results amply justify the provision of special education for autistic children.

6. 2. *How far is educational progress dependent on the type of unit?*

As judged by their achievements in reading and arithmetic there is no doubt that the children at Unit *C* fared best. Because this was not (and could not be) an experimental study, it was not possible to establish casual links between particular features of each unit and the changes in the children. Accordingly, judgments are required to assess which features of each unit had which effects.

Unit *C* differed from both the other units in the amount of formal classroom teaching. In Unit *C* there was 9 hr classwork per week compared with an average of 4 hr at Unit *B* and less than 1 hr at Unit *A*. In addition, Unit *C* laid most emphasis on structure, organisation and the teaching of specific skills. It appears that this emphasis led to greater attainments, and that *an autistic unit with large amounts of specific teaching in a well-controlled classroom situation is likely to bring the greatest benefits in terms of scholastic progress*. That these are the relevant dimensions is suggested by the fact that there was a steady gradient in these characteristics from Unit *A* to Unit *B* to Unit *C* and that there was a similar gradient for scholastic progress. A study by Schopler *et al.* (1971) showed that autistic children responded better to a structured than to an unstructured environment, and their findings also give support to our conclusion that autistic children need systematic teaching in an ordered environment if they are to make optimal scholastic progress. This conclusion is important in that many autistic units are not run on these lines. The results of this study suggest that they should be.

However, it is important to specify what we mean by "structure", as the word has come to carry overtones we would not wish to imply. By a structured situation we simply mean one in which there is a task orientation such that the adult determines what the child should be doing. For example, it would mean that the teacher might act in a way which ensured that a child engaged in a play situation with other children rather than stand in a corner carrying out solitary stereotypies. Whereas the normal child may well be able to profit by the opportunity to discover things for himself, the autistic child's handicaps impede him in this and he needs to be *taught* how to make use of opportunities. The content of the "task" should, of course, be tailored to the needs and to the developmental level of each child. It might consist of building bricks, of co-operative play, or of reading, according to what was individually appropriate. "Structure" carries no implications of rigidity or of rote learning. Nor does it carry any implications of "discipline" or "forcing". Encouragement, praise, and interest are usually the best ways of getting a child to do something. It should be added that the organisation of the classroom is also irrelevant to the concept of structure. For some purposes task orientation is best accomplished by kneeling together on the floor in an open plan setting rather than by sitting the child at a desk in a traditional classroom. What *is* important is that the teacher make some decision on what is most helpful for the child and then take the appropriate action to bring about the desired effect.

We would make the additional recommendation that a structured setting be used by staff to provide all children with specific teaching with respect to language skills and social competence. For school-age children with an I.Q. above 50 or so there should also be instruction in reading and in other scholastic subjects. There has sometimes been the assumption that autistic children are "too disturbed" to profit from such teaching but our results indicate that this view is mistaken. Certainly, the autistic child needs specially skilled teaching but, given that, he can gain useful scholastic skills.

It is occasionally suggested that specific skill-oriented teaching, such as that used at Unit *C*, tends to lead to the acquisition of restricted mechanical skills at the cost of impaired understanding. There is a problem in aiding the development of understanding in autistic children, as discussed below. However, the results clearly showed that the children in Unit *C* were *not* more handicapped in this respect than those at Units *A* and *B*. Indeed, they were appreciably less handicapped. *All* the eight children able to solve arithmetical problems were at Unit *C*. Similarly, of the 18 children with any score on the Neale reading comprehension test, 15 were at Unit *C*. It is evident that a structured approach to education is compatible with learning which involves understanding.

It should also be emphasised, in view of what is said below about problems in the transfer of behavioural gains in one situation to another, that the children's educational attainments were *not* situation or task specific. A particular point was made of testing the children's attainments in a room separate from the classroom and on tasks differing in content from those used in teaching. Although the attainment levels assessed in this way were often below those claimed for the child by his teacher, they were nevertheless considerable. To what extent the child was able to use these scholastic skills in his life outside the school is another matter and not one we were able to measure. Even so, anecdotal evidence suggests that at least some of the children *did* use their attainments in a useful way at home. It is not known whether or not there were differences between the units in this respect.

6. 3. *How far is educational progress dependent upon the nature and severity of the child's handicap?*

It was found that, generally, most educational progress was made by the least handicapped children and least progress by the most handicapped. This was true to some extent with respect to all types of handicap but was most marked in the case of intelligence. An I.Q. score was the best single indicator of the children's progress in all spheres of development—social and behavioural as well as strictly scholastic. As the predictive importance of an I.Q. score has been shown in all previous studies which examined the issue (Rutter, 1970), it may be accepted that this is a general finding of wide applicability regardless of the children's educational experience.

It must be added that for an I.Q. score to be used in this way it must consist of a non-verbal score based on adequate testing on suitable tests by a psychologist experienced in the testing of autistic children. Because autism is a relatively uncommon disorder (occurring in 2–4 children out of every 10,000—Lotter, 1966; Brask, 1967; Treffert, 1970), few clinics have much experience of the condition and skilled psychological assessment is not available in all areas.

6. 4. *How far does educational progress correlate with social and behavioural progress?*

Although virtually all assessments of the children's progress related to their initial I.Q. level, there were only weak associations between the measures of progress in different aspects of development. That is to say, for example, a child's improvement in on-task behaviour could not be reliably predicted from his improvement in reading or arithmetic. The associations were marked only with related functions. Children who made good progress in reading, on the whole, made fair progress in arithmetic, although there were many exceptions. Similarly, children who showed many deviant behaviours generally had a high level of social handicap ($r=+0{\cdot}80$), almost by definition as it was the deviance which caused restriction of family activities. Less obviously, however, an increase in social responsiveness tended to accompany a diminution in deviant behaviour ($r=+0{\cdot}46$) and a lessening in social handicap ($r=+0{\cdot}50$). However, there was no consistent tendency for improvement in scholastic attainments to be associated with social or behavioural improvement.

6. 5. *Does the pattern of social, behavioural and educational progress vary between units?*

The chief difference between units in the pattern of progress concerned the children's scholastic attainments. There was a similar improvement in behaviour, social handicap, and social responsiveness in all three units. However, at Unit *A* this was accompanied by rather small gains in scholastic attainment and the children's behaviour while at the unit tended not to be task oriented. At Unit *B*, somewhat higher levels of scholastic achievement were reached and the children's behaviour at the unit was more often directed and organised. However, only at Unit *C* were the scholastic achievements more uniformly good and the children's behaviour more consistently task-oriented. In short, the differences between units in organisation structure and style of staff–child interaction were associated with marked differences in the children's scholastic attainment but with few differences in any other sphere of progress.

These were the five key questions posed at the start of the study but other equally important questions emerged during the course of the investigation.

6. 6. *What factors in the unit led to the children's social and behavioural improvement?*

The fact that the children in all three units made equal social and behavioural progress suggests that either progress was independent of the school environment, or that there was some common element in teacher behaviour across all three units which was crucial in this respect, or that the progress in each of the units stemmed from different mechanisms. No hard evidence is available which might allow a choice between these alternatives. However, the finding from previous studies (Rutter, Greenfeld and Lockyer, 1967) that children receiving schooling make better social progress than children not receiving schooling makes the first alternative unlikely.

There may be some truth in both the other two alternative explanations. The common factor in staff behaviour probably lies in the high level of staff–child interaction. In all three units the staff were very actively engaged with the children. This was likely to be helpful in developing social responsiveness (Rutter and Sussenwein, 1971) and also it may have gone some way in reducing deviant behaviour. Autistic children are most inclined to engage in stereotypes and disruptive behaviour when left to their own devices. Because autistic children persist for such short times in constructive activities when unsupervised, a high staff–child ratio as well as high staff activity is necessary. In consequence, we suggest that many autistic children, at least when young, are likely to make less progress in special schools with fewer staff per child than in the units studied, and less progress in autistic units where the staff do not intrude on and actively interact with the children.

For social responsiveness and behavioural control to develop it is necessary that schooling include more than formal classwork, It is relevant in this connection that even in Unit *C*, which was the most structured of the three units, 16 hr per week were spent on free play, music, gymnastics, art and the like—nearly twice as much as that given to formal classwork, In fact, the amount of time given to these activities was about the same in all three units. It should be added that although these activities were relatively unstructured compared to the lessons in reading and arithmetic they were far from unplanned. If they are to aid social development, it is essential that careful thought be given to how the time should be utilised. We are in agreement with the emphasis given to these activities in all three units (although not with the de-emphasis on specific teaching which was present at Unit *A* at the start of the study).

The strength of Units *A* and *B* lay in their warm positive interaction with the children, the strength of Unit *C* in the ample provision of systematic teaching. Perhaps the social and behavioural improvement of the children in Units *A* and *B* stemmed from the development of strong relationships with the staff whose praise and disapproval were the more effective because of this. Unit *B* staff made better use of their warmth by using it in a discriminating way to encourage some behaviours and discourage others. Greater progress might have occurred in Unit *A* children if the staff in that unit had done likewise. In contrast, the social and behavioural improvement of the children in Unit *C* may have come about because the staff in that unit were more effective in teaching them specific skills which enabled them to bypass or overcome their handicaps. If these conclusions are correct, then the results for Units *A* and *B* could be improved by the provision of more systematic teaching and those for Unit *C* by the greater use of warmth and praise.

Because the Unit *C* staff made generally effective use of contingencies in responding to children's behaviour it might be expected that the children there should have shown better behavioural control than they did. That they did not at home, is probably partly a function of lack of generalisation (a problem discussed below). However, it may also be a result of the relative lack of warmth and physical contact at Unit *C*. Although criticisms of the children were clearly and appropriately expressed, praise was muted and flatly given. This failure of dedicated staff to display much positive emotion may have resulted in their approval being less effective than it would otherwise have been.

This comment is apparently out of keeping with the finding that the children at Unit *C* often rapidly improved in behaviour after admission to the school and that most of them gained greatly in social responsiveness. It should be added that the children at Unit *C* seemed just as happy as those at the other units and they, too, developed important relationships with the staff, particularly the Head with whom they had most contact. In this connection, it is relevant that the Head of the unit took all new children entering the school, was responsible for most group activities, often took children away to the country at weekends, and, by virtue of the position of Head, had greater influence on children than did other staff. Unlike most of the staff, the Head showed a lot of warmth and physical contact with the children. Possibly, results at Unit *C* might have been even better if other teachers had also managed to combine warmth and physical contact with structure and consistent handling.

That there were such marked differences between the Head, another senior teacher, and the rest of the staff at Unit *C* suggests that something was wrong with staff communication within the unit. Staff in all such units need to have a forum where they can discuss among themselves both problems of individual children and techniques of teaching and child care, to explore ways of improving methods and to exchange ideas. It is also valuable for staff to have access to books and articles and to have the chance of direct contact with outside specialists. It is necessary, furthermore, for Heads of units to actively encourage such dissemination of information amongst staff.

6. 7. *What contact with parents is needed?*

Although on-task behaviour in the classroom was more often shown by the children at Unit *C*, than by those at *A* or *B*, this was not accompanied by a similar advantage in behaviour at home. Several children who were well behaved at school were severely disruptive at home and there were no differences between units on any of the parental measures of the children's behaviour or social responsiveness. It would seem that not enough was done to ensure that parents also learned how to help their children. Evidence both from this study and others suggests that improvements shown by autistic children in one situation will not necessarily generalise to other situations unless particular steps are taken to ensure that this happens. Thus, Lovaas *et al.* (1972) have recently reviewed their results from treating children with behaviour therapy. They found that the gains while the children were in hospital were soon lost after discharge. Only when the parents were actively involved in carrying out treatment were the gains maintained.

Unit *B* was the only unit to actively involve parents in its running and Unit *A* the only one to make regular use of casework with parents. Some of the families were receiving help from clinics and this sometimes partially met parents' needs. Nevertheless, even when such help was available, it often failed to link up effectively with what was being done in the unit. A much greater emphasis on the child's behaviour at home seems needed. Unless parents are taught how best to deal with their children, the behavioural gains in the unit are likely to be of limited benefit. Services need to be provided to give parents specific help and to ensure that the unit and the home work *together* for the benefit of the child.

6. 8. *What is the the value of residential schooling?*

The same issue arises with respect to residential schooling. Boarding places are certainly required both for geographical reasons and because families are sometimes unable to cope. However, our results show that the weekly boarders at Unit *C* made no better progress than the day children with regard to their behaviour and social responsiveness while outside school. Indeed, one child who boarded at Unit *C* and whose behaviour there posed no severe problems had to be admitted to a subnormality hospital during the holidays because the parents were unable to manage him. We are aware that this problem has arisen with several other autistic children at various other autistic units not included in the study, and was present to some degree in several of the other children in the study. It appears that the difficulties occasionally become aggravated during residential schooling because as the staff gain in skill in knowing how to circumvent, avoid, and ameliorate disturbed behaviour, the parents through lack of experience lose some of their previous skills and lack the opportunity to gain new skills. It is for this reason that several groups of workers who previously made much use of hospital in-patient treatment for autistic children are now movimg away from in-patient care to work directly with parents in the child's own home (e.g. Lovaas *et al.*, 1972).

These problems do not mean that residential schooling has no place in the education of autistic children. To the contrary, it may be crucial in providing more intensive care at times of severe disturbance, in relieving families in crisis, and in enabling skilled teaching to be available for children living in small isolated communities. Nevertheless, if the undoubted benefits to the child while he is at school are to spread to include his behaviour outside school, there must be deliberate intensive and planned efforts to include the parents in attempts to develop ways of helping the child become more socially responsive and show less deviant behaviour as well as gain in scholastic attainments.

6. 9. *Should autistic children be mixed with non/autistic children?*

There is general agreement among teachers of autistic children that there should be a preponderance of speaking children over mute children in order to aid the development of communication. This was present in all three units and seems generally desirable. However, there is less agreement on the value of mixing autistic with non-autistic children in the same class. It has been argued that contact with socially responsive (non-autistic) children aids social development. Our findings suggest that the presence of non-autistic children is no guarantee that mixing will take place. Our observations showed that interactions between autistic and non-autistic children were quite rare and there seems to have been no special advantage to the mixed classes at Unit *B*.

The children at Unit *B* were mostly quite young (none was adolescent) and most of the non-autistic children were behaviourally disturbed. Accordingly, it is not possible to draw any conclusions about the value of mixing with non-autistic children during the later school years (when autistic children tend to be more socially responsive), or about mixing with older mentally retarded children (as done at some of the Rudolph Steiner schools). All that can be said is that autistic children (at least when young) are very dependent on the active intrusion of others for social interaction to take place. This is most readily provided by adult staff and tends not to be provided by young disturbed children.

6. 10. *How can autistic children be helped to understand what they learn?*

The scholastic progress of the children, especially at Unit *C*, was gratifying and it appeared that skill-oriented systematic teaching played an important part in aiding this progress. Nevertheless, it is a cause for concern that the children's understanding of what they learned lagged behind their mechanical skills. This was evident, for example, in the finding that reading comprehension was much inferior to reading accuracy. This defect in learning was equally apparent in all three units so that it is not accountable for in terms of differences in teaching methods. It is probably a defect which is inherent in autism, but that does not mean that it is necessarily irremediable. What it does imply is that any educational approach used with autistic children, if it is to succeed, must pay particular attention to the acquisition of meaning and understanding. Our results suggest that this does not happen often enough.

Observations suggest that behavioural disturbance in autistic children tends to increase when the child is in a situation where he cannot understand what is expected of him. To the extent that this is a valid conclusion, more systematic concentration on helping the children gain understanding and appreciate meaning might result in social gains as well as improved scholastic attainment.

Whether understanding might come faster if there were a greater emphasis on helping the children gain language competence is not known. Although speech therapists saw some children in all three units, and although there was a focus on language in teaching, in none of the units was there as comprehensive a language training programme as there might be. Training in language comprehension consisted mainly of practice in naming and recognising objects and pictures and in carrying out simple commands. It would be worthwhile exploring the possibility that systematic training in language, with a special emphasis on language comprehension, might aid the children's learning. Also it would probably be worthwhile going to considerable trouble to ensure that children learn how to apply their scholastic skills to everyday life situations. Reading, for example, might be used to follow instructions, to read notices in public places, or to determine the route of a particular bus. Similarly, arithmetic could be applied to shopping, paying for tickets on public transport or dividing out sweets at school. Of course, this was and is done in the units but perhaps it ought to be done more. A child is likely to be better off with reading accuracy and comprehension both at 8 yr, than with an accuracy of 9 yr but a comprehension at only 7 yr—or with simple arithmetical skills he can apply outside school rather than with higher skills which he can use only in the familiar classroom context.

The structuring of school activities is a useful concept. However, to be of maximal benefit, the structuring must take place around *relevant* activities. For autistic children these must include language and social skills.

The important association between I.Q. and educational attainment implies that, within an environment providing systematic structured learning opportunities, the goals set for each child must be realistically evaluated and modified from time to time in the light of his progress in the unit. This is done in all the units but they were all handicapped by the lack of facilities for adequate monitoring of the children's progress.

6. 11. *What type of assessment of the children should be available to schools?*

None of the units had sufficient access to skilled and specific psychological assessment of the children. Units *A* and *B* shared clinical psychological services with the main hospital in which the units were situated but this did not appear to meet adequately the needs of the autistic units. Unit *C* had no psychological provision. The information available from clinics and local authorities at the time children were admitted to the units was generally quite poor and systematic psychological assessment was rarely available. The lack of psychological services meant that the staff in all three units had to rely on their own judgements in evaluating children's progress. This is more difficult in the case of autistic children than for normal children because of the mechanical and situation-specific nature of much of autistic children's learning. The availability of regular systematic information on each child would help staff to appreciate how far the child had acquired understanding and ability to apply his knowledge. It would also help staff avoid setting unrealistic goals for children. It is suggested that autistic units should have psychological services available.

6. 12. *How can children be transferred from autistic units to normal school?*

A number of special problems consistently arose in the case of the small group of autistic children who transferred to normal schools. In spite of prior consultation and discussion between the staff in the autistic unit and staff in the ordinary schools, all the children showed some increase in disturbance after transfer, sometimes with the re-emergence of tantrums, self-injury and disturbances of eating or drinking.

In part these problems arose from the autistic child's difficulty in adapting to new environments, his difficulty in coping with the teasing of normal children and in part from the staff's ignorance of the behaviour of autistic children. However, to a considerable extent, the problems seemed to stem from a lack of structure in the new environment, insufficiently explicit demands on the child and a reliance on group teaching. Although the three units varied a good deal in their approach, all were much more specific in their expectations, more individualised in approach and more structured than an ordinary school. After transfer, the autistic children tended to wander around, failed to occupy themselves and became rather lost in trying to cope with group teaching.

Nevertheless, in all cases, the children eventually settled down and profited from the move. Improvements seemed to follow a number of commonly occurring events in the new school. The three most important appeared to be:

(i) the staff provided more individual structuring and explicit direction of the child's activities,

(ii) the staff began to analyse the precipitants of disturbed behaviour, instead of construing it in terms of "right" and "wrong", and so dealt with it more rationally and calmly,

(iii) extra tuition was arranged to help with specific learning problems (e.g. one child was given special English lessons to aid his comprehension).

Peer group activities proved a problem with all the autistic children. None was able to participate in an age appropriate way and some were disturbed by teasing until staff provided help and support with this. Quite often the autistic child was "adopted" by other children in the group, rather like a younger child might be.

These observations suggest that the transition to normal school requires extremely careful preparation both of the child and of the staff of the new school. Some notion of the characteristics of autistic behaviour needs to be accurately conveyed, together with the possibility of marked differences at first between the child's current educational performance at the autistic unit and his likely performance at the new school. At least as important is consultation between the staff of the autistic unit and staff at the ordinary school *after* transfer. That the autistic children settled down as well as they did in the long term owes a lot to the support and advice provided by the autistic unit staff for some time after the child changed schools.

The gap between highly specialised schools and ordinary schools is very large, as shown by the existence of similar problems in the transfer of (non-autistic) language retarded children from a residential special school to ordinary schools (Griffiths, 1969). If more children are to successfully transfer it is essential that the skills of the special school be transmitted to the ordinary school—perhaps by greater use of specialised peripatetic teachers (Rutter, 1972).

6. 13. *What are the needs of adolescent autistic children?*

The number of adolescent autistic children in the present study was small. However, it was clear from those included in the investigation, that there is an important group who can continue to make worthwhile educational progress, but who have not reached the point where they can transfer to less specialised schools. This is important as many autistic units do not cater for children above 12 yr of age. We suggest that provision for this adolescent group is greatly needed.

The question also arises as to how long schooling should continue. Obviously this must vary from child to child, but the fact that 2 children in the present study achieved C.S.E. passes after reaching the age of 16 yr, suggests that continuation beyond the end of compulsory schooling is highly desirable for some autistic children. Evidence from the progress of autistic children not included in this study also supports this view.

Although very few children were followed after completing schooling, it was all too obvious that the facilities for aiding autistic children in the transition from school to work were inadequate. Special training provision would be valuable in helping some children gain employment. We have no findings which would help decide whether this facility should be available in units for autistic children or whether it would be better provided separately for a wider group of handicapped youngsters.

6. 14. *What are the needs of the under-fives?*

We have no data on children below the age of 5 yr. However, the finding that autistic children need specific help with language and with socialisation certainly suggests that this help should begin before the age of 5 yr. We suggest that the treatment of pre-school autistic children requires study (Rutter and Sussenwein, 1971).

6. 15. *Is education equally valuable for all autistic children?*

To answer this question it is first necessary to specify what is meant by education and what educational goals are to be achieved. Even the most mentally retarded children in the three units showed marked social and behavioural improvement.

We would argue that this is a worthwhile gain: and one properly included in the aims of education. The fact that the children in Unit *C* showed most improvement in their classroom behaviour implies that the type of schooling matters for the severely handicapped as well as for the mildly handicapped. In that Unit *C* provided the most structured environment it also implies that structuring is most important for the autistic children at the lowest developmental level. This inference is supported by Schopler's study of individual differences in the effect of treatment structure on the development of autistic children (Schopler *et al.*, 1971). He and his colleagues found that the lower level autistic children were more disturbed by lack of structure than were the higher level children. This finding also carries the implication that younger autistic children need more structure than do older children. It will be appreciated that this runs completely counter to the modern tendency to provide rather unstructured environments for young normal children in nursery and infants' schools. It seems that this is quite inappropriate for autistic children and is an example of the special and different needs of this group of children.

While the progress and special needs of the most handicapped autistic children emphasises their educational requirements, other findings point to the differences between autistic children whose non-verbal I.Q. is above 50 and those in whom the autism is accompanied by severe mental retardation. It is noteworthy that 3 children transferred to hospital units for the severely subnormal during the course of the study, 2 to junior training centres, and 2 children in Unit *C* were separated from the rest in a class for "slow-learning" children which was started during the study. This implies that the Heads of the units thought that different classes were needed for the most handicapped children. We agree with this view.

Our educational findings showed that none of the most retarded children gained any traditional scholastic skills. Of the 16 children with an I.Q. below 44, none made any gain in reading over the course of 4 yr. This strongly suggests that the most severely retarded children will not gain any useful skills in the 3 "Rs", even with the best available special schooling of the type currently provided for autistic children. Below I.Q. 40 or so, there is probably no point in hoping for the child to learn reading or arithmetic and such children should not be admitted to autistic units geared to the teaching of the 3 "Rs". The children will acquire social skills and show behavioural development and the extent to which they do probably depends on the type of schooling they receive. Special schooling is warranted even for the most handicapped, but the need is for a different type of schooling to that required for the less handicapped autistic children. Whether the schooling for these severely retarded children should be in an autistic unit or whether they should be together with other non-autistic children remains uncertain. We have no data which allow any decision on that point. However, if the schooling is provided for a mixed group of children, our findings suggest that it should be run on structured lines and it should provide systematic aid with communication and socialisation.

Between I.Q. 40 and 50 some autistic children will acquire traditional scholastic skills but many will not. On the whole prognosis is not good in this I.Q. range, but a few children make worthwhile progress in reading and arithmetic, so that systematic teaching in reading and arithmetic should be available. Above I.Q. 50 or thereabouts a much higher proportion of autistic children can be expected to gain useful scholastic skills and it is in this group that the scholastic benefits of education are most clearly seen.

Of course, this does not mean that the educational needs of the most retarded autistic children should be neglected. The history of studies into mental retardation clearly indicates that people have consistently underestimated what can be achieved by handicapped persons given optimal teaching (Clarke and Clarke, 1965). It may well be that autistic children with an I.Q. below 40 or 50 could make more progress if we knew enough about the whole process of learning in this group of children. This possibility should act as a challenge to do better in the future and should serve as an incentive to develop new and better techniques of teaching. What can be concluded is that in all the autistic units included in this and in other studies the severely retarded autistic children failed to learn to read, write or do sums. Perhaps their teaching should be oriented in other directions and, whether or not this is so, we suggest that their needs and accomplishments are sufficiently different from the autistic child of normal or mildly retarded intelligence that separate provision should be made in order to develop better teaching methods tailored to their particular problems.

6. 16. *Small classes or larger schools?*

All the units studied were moderately large, with at least half a dozen staff and several classrooms available. This provision made it possible to divide up the children into small groups with similar educational needs, to remove severely disturbed children from the group to avoid disruption of the others, and for there to be a considerable measure of staff support so that teachers could help each other as difficulties arose. These seem very considerable advantages. Against these must be set the disadvantage that several of the children had to travel quite long distances to get to the units. The pros and cons of small local classes as against larger regional units warrant careful study. Our observation of very small classes outside the study suggests that the handicaps associated with one teacher taking a few autistic children in a single room are so great that this arrangement is rarely to be recommended. However, there may well be considerable merit in the provision of only slightly larger units with perhaps 2 rooms and 2 teachers. The issue requires investigation.

7. CONCLUSION

In this last section of the report, an attempt has been made to move from the firm research findings to a consideration of some of the wider issues involved in the education of autistic children. In doing this it has sometimes been necessary to be rather speculative. While we have tried to be explicit about how well based each of our recommendations are, it will be appreciated that many of our suggestions need careful evaluation before they can be accepted. As the staff of all three units would be the first to recognise, there are many ways in which the teaching of autistic children might be further improved. Whether the ways mentioned in the report are among these requires testing.

Nevertheless, this study of staff behaviour and of children's educational progress has been worthwhile in showing what can be achieved in the education of autistic children and in demonstrating the strengths and weaknessess of particular types of staff–child interaction. All the units have made contributions to our understanding of how autistic children should be taught and cared for, and all have helped individual children to a marked extent. The ideal autistic unit would probably consist of an amalgam of the best features of each, together with the addition of a number of specialist supporting staff.

SUMMARY

Autistic children attending three different special units were followed up over a $3\frac{1}{2}$–4 yr period to assess changes in educational, cognitive, linguistic, social and behavioural status. The group as a whole had made considerable progress in all spheres and it was concluded that the results amply justify the provisions of special education for autistic children. Comparisons between the units suggested that large amounts of specific teaching in a well-controlled classroom situation is likely to bring the greatest benefits in terms of scholastic progress. The findings are used to consider a variety of specific questions in relation to the optimum types of schooling required for autistic children.

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APPENDIX I

Rating scale for number ability

Item	*Score*
Identifies 5+ digits	1
Counts 5+ objects	1
Adds 1 figure numbers	1
Adds 2 figure numbers	1
Adds 3 figure numbers	1
Subtracts 1 figure numbers	1
Subtracts 2 figure numbers	1
Subtracts 3 figure numbers	1
Multiplies 1 figure by 12 or less	1
Multiplies 2 figures by 12 or less	1
Multiplies 3 figures by 12 or less	1
Multiplies 2 figures by 2 or more figures	1
Multiplies 3 figures by 2 or more figures	1
Divides 144 or less by 12 or less	1
Divides 145 or more by 12 or less	1
Divides 3 or more figures by 2 or more figures	2
Does problems involving addition	2
Does problems involving subtraction	2
Does problems involving multiplication	2
Does problems involving division	

Does problems involving fractions	2
Does algebra	3
Does geometry or trigonometry	3
Total	32

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DESIGN-CRITERIA RELATIONSHIPS IN BEHAVIOR THERAPY RESEARCH WITH CHILDREN

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Many clinicians and researchers are claiming high success rates and dramatic changes using behavior therapy techniques to change childrens' behavior. The degree of change to be expected when no treatment is given has been established in previous research on traditional psychotherapy with children. These reviews have claimed that psychotherapy does not significantly facilitate improvement of children's behavior over baserate levels of 73 per cent (Levitt, 1957), 64 per cent (Levitt, 1963), or 72 per cent (Eysenck, 1961). These studies have focused on the relative effectiveness of psychotherapeutic techniques rather than on the adequacy of the investigation's experimental design.

In evaluating the effectiveness of behavior therapy techniques with children, one needs to consider not only the overall degree of change produced by the techniques but also the adequacy of control over critical variables in conducting the treatment or research. If the latter is not done, then it cannot be established that the behavior therapy program produced the therapeutic changes. Knowledge of the relationship between behavior change and the methodology responsible for that change is thus crucial in understanding the outcome of behavior therapy treatment and research with children.

At this time a comprehensive review of design criteria used in evaluating behavior therapy techniques with children is clearly needed in light of its much more frequent use in numerous settings (such as schools, clinics, institutions, and homes) and inadequacies of previous reviews in this area. Previous reviews of behavior therapy research with children (Bandura, 1961; Gelfand and Hartmann, 1968; Pawlicki, 1970; Rachman, 1962; Werry and Wollersheim, 1967) have not all restricted their evaluation to research solely with children. One of the reviews is based on research dealing primarily with adults (Bandura, 1961), while another review based its conclusions on research pertaining to adults not children (Werry and Wollersheim, 1967). In only two of the five reviews (Gelfand and Hartmann, 1968; Pawlicki, 1970) was the adequacy of experimental designs evaluated.

Since numerous studies involving behavior therapy techniques involve only one subject, a review of a large number of these case studies is needed if broad generalizations are going to be made. Various authors have used different variables to evaluate

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the adequacy of the designs of studies in this area. Thus, selection of the most critical design variables is needed in order to facilitate standardized classification and review. A critical review of this type can then legitimize appropriate claims and minimize exaggerations regarding the success of behavior therapy techniques to date. It can also identify areas where behavior therapy researchers have failed to achieve acceptable standards of scientific precision.

Current critical reviews of behavior therapy with children (Gelfand and Hartmann, 1968; Pawlicki, 1970) have claimed that most behavioral studies on children are inadequately designed. In fact, Pawlicki claims that only 4 per cent of the studies he reviewed met Eysenck's three criteria of control group, baseline, and follow-up. There is a need then to examine the inter-relationships between design characteristics and outcome results for studies in this area. The purposes of this review are the following: (a) to determine which design criteria are appropriate for evaluating studies using behavior modification with children, and (b) to evaluate an adequate sample of studies in this area on the basis of selected design criteria.

Criteria appropriate for evaluating a study must be selected in terms of the type of experimental design used in that study. Two types of designs were considered in this review. They were intrasubject designs (Dinsmoor, 1966; Gelfand and Hartmann, 1968; Sidman, 1960) and group designs of a nonfactorial type (Paul, 1969). Factorial group designs (e.g. Winer, 1962) and multiple baseline designs using random sampling of individual organisms (Revusky, 1967; Risley, 1969) were not considered because of their infrequent application to date.

Given the tremendous number of studies involving behavior modification techniques with children, an evaluation of all relevant studies is impractical. In order to classify the vast number of studies, previous researchers have used the goal of the treatment technique (Gelfand and Hartmann, 1968); the type of behavior therapy technique used (Bandura, 1961; Rachman, 1962; Werry and Wollersheim, 1967); the type of problems treated (Werry and Wollersheim, 1967); and sampling over a certain period of years (Pawlicki, 1970). Ideally, the type of studies to review would be a random sample of all experimental studies involving behavior modification techniques with children, regardless of the type of behavior studied and therapeutic goal.

No specific sampling technique was used in Pawlicki's review (1970) of 54 studies during 1965–69. These studies were assumed to be an adequate sample of behavior modification research with children—although they were perhaps not a truly random sample. To evaluate the adequacy of Pawlicki's sample, studies referred to in other reviews (Gelfand and Hartmann, 1968; Werry and Wollersheim, 1967) during the same period were compared with the studies reviewed by Pawlicki. Of the 54 studies evaluated and tabled by Pawlicki (1970), 22 per cent had been reviewed by Werry and Wollersheim (1967) and 35 per cent had been reviewed by Gelfand and Hartmann (1968). These studies cover a broad gamut of behavioral problems ranging from individual childhood autism to unmanageable classroom aggressiveness in adolescent offenders. The ages of the *S*s ranged from infancy to 18 yr.

DESIGN CRITERIA AND DEFINITIONS

Design criteria, which are essential for evaluating behavior modification research with children, have been specified by Pawlicki (1970). These five design variables include the following: control group, baseline, systematic variation of treatment, an unbiased observer, and follow-up. Four criteria are essential for evaluating single organism within-subject designs: baseline, systematic variation of treatment, unbiased observer, and follow-up. A control group is not a necessary design criterion for judging intrasubject designs, although it can be used in evaluating them (Meichenbaum, Bowers and Ross, 1968; Patterson *et al.*, 1965; Wolf *et al.*, 1968). Four criteria are appropriate for evaluating the adequacy of group designs of the nonfactorial type (Paul, 1969). These criteria are: control group, baseline, unbiased observer, and follow-up. Each kind of design, therefore, has its own set of criteria that need to be used to judge a study's validity.

The present authors used straightforward definitions of the five design variables in evaluating the studies on behavior therapy with children. These definitions were then compared individually with Pawlicki's (1970). The control group criterion necessitated the assignment of subjects to at least one no-treatment control group and one experimental group. This definition is assumed to be identical to the one used by Pawlicki, although he does not clearly define his term. The control group criterion enables a researcher to infer that treatment variables *per se* and not alternative variables account for the therapeutic changes. For example, the Kondas (1967) study instead of using a control group of children who received no treatment, used data based on children treated two years earlier in another country which was then compared with data based on children treated with the shadowing method for stammerers. The failure to include a control group means that it has not been proven that the beneficial changes would not have occurred anyway (even if the shadowing technique had not been used).

Baseline data were defined as data collected for specified periods of time or for a specified number of responses prior to treatment. When inappropriate behaviors frequently occur (such as shouting, stuttering, not attending, etc.), baseline data commonly will be collected for a one to two week period (Browning, 1967; Buell *et al.*, 1968; Hart *et al.*, 1968). However, if deviant behaviors infrequently occur (such as hurting others) or have quite undesirable consequences (such as self-destructive behavior, enuresis, etc.) only a few behaviors may be recorded before treatment is started (Pumroy and Pumroy, 1965).

The present definition of baseline data is essentially similar to that of Pawlicki, i.e. defined as "*a measure of the treated* (*target*) (sic) *behavior taken before experimental contingencies are presented*" (p. 164). However, Pawlicki qualifies this definition with one inappropriate limitation and one unnecessarily strict limitation. Inappropriately, he claims a baseline should be "*obtained over a period of time sufficient to attain reliability*" (p. 164). However, baseline concerns the degree of stability or variability in behavior (Sidman, 1960), not the reliability which deals with correlated judgments between observers at a given point in time about the occurrence of behaviors or the consistency of behavior under standard stimulus conditions on different occasions (Anastasi, 1968). Also, Pawlicki unnecessarily eliminates data collected by reinforcing agents such as parents and teachers, whereas the present authors do not.

The criterion of systematic variation of treatment was considered met if there were either a reversal of reinforcement contingencies or, when this was not possible, any one of the four alternative treatment manipulations mentioned by Gelfand and Hartmann (1968). The four treatment manipulations include the following: a yoked control treated identical to the treatment subject except for the omission of the specific treatment ingredient; manipulating subunits of the target behavior; contingency changes having predictable effects on response emission; and contingency reversal for limited aspects of target behavior and/or discriminable conditions. Any one of these treatment manipulations may be used when the consequences of treatment are so irreversible that baseline performances cannot be recovered. Any one of these five procedural operations will demonstrate reinforcement control over target behavior due to contingency changes, which is Pawlicki's definition of systematic variation of treatment.

The unbaised observer criterion is defined as the use of two or more sources of data (which may be two observers or one observer and an automatic recording device), other than the treating therapist, whose observations are correlated to establish adequate reliability between independent observations. Pawlicki (1970) uses a stricter definition of unbiased observer, i.e. observers were "unaware of changes in the reinforcement contingencies or the treatment group of observed *S*". Defined in such a strict manner, this criterion would be inappropriate for certain types of common designs in which reinforcers (tokens, for example), would be tangible and easily observed by any observer and necessarily be in contingency with the subject's reinforced behavior. When unbiased observers are used, therapeutic changes can be attributed to the administration of the treatment technique rather than biases or expectations of a therapist. The tendency for a therapist to report the results he expects cannot be ruled out if a therapist both treats a child and reports on the results of treatment (Graziano and Kean, 1968; Feldman and Werry, 1966).

Follow-up was considered to be any re-evaluation of the problem behavior after the lapse of a reasonable period of time following the last post-treatment assessment. Pawlicki's definition of follow-up data was liberal in that the exact procedures used in obtaining the follow-up data need not be specified. The present definition is also liberal in this regard, although again follow-up data obtained from either parents or teachers was used, whereas Pawlicki excluded it. An adequate follow-up should include post-treatment reports on the treated behaviors (O'Leary, O'Leary and Becker, 1967) and can be conducted in person or by 'phone (Wetzel *et al.*, 1966). The follow-up allows the researcher to conclude that therapeutic changes endure over time and are not limited to the treatment period.

Considering all five of the present definitions in comparison with Pawlicki's, similar definitions are used with respect to the control group and systematic variation of treatment. Somewhat more liberal definitions are used with baseline and follow-up and unbiased observer. Reports from parents and teachers were considered appropriate with regard to baseline and follow-up. In defining unbiased observers, an adequately correlated judgment between non-therapists was the only necessary criterion employed.

COMPARATIVE ANALYSIS OF RESEARCH DESIGNS

A comparison between how Pawlicki (1970) and the present authors classified data from behavior therapy research with children during 1965–1969 is presented in Table 1.

The present authors' data in Table 1 are based on 51 of the 54 studies reviewed by Pawlicki. Data from three studies (Ferster and Simons, 1966; Gelbert and Meyer, 1965; Hudson and DeMeyer, 1968) were excluded because they were considered to be of the uncontrolled, anecdotal type (Paul, 1969). Anecdotal studies were defined as studies reporting no systematic data collection indicating quantitative measurement over time or pre-treatment post-treatment quantitative measurement.

In Table 2, the present authors; percentages indicate the proportion of studies which met each of the five criteria—*if it were appropriate to the type of design* (intrasubject vs. group design) used in the study. Of course, Pawlicki's percentages do not take such design-criteria relationships into account. As can be seen from inspection of Table 2, Pawlicki's percentages consistently underestimated the percentage of studies meeting the design criteria, except for the follow-up criterion. The mean of the percentages of studies meeting five of the criteria was 36·4 per cent for Pawlicki; whereas it was 66·6 per cent for the present authors, using the "combined" values for both intrasubject and group designs when available. When the two least met criteria (unbiased observer and follow-up) are selected, the mean of the percentages drop to 24·0 per cent for Pawlicki, but to 46·0 per cent for the present authors.

Since somewhat more liberal definitions were used by the present authors for three of the five design criteria (baseline, follow-up, and unbiased observer), the differences in percentages between Pawlicki and the present authors could be attributed to these differences in definition rather than the factoring-out of design-criteria relationships. Thus, the present authors' percentages were also adjusted to take into account the differences in definition. This was done first by, (a) calculating the number of studies which met each design-criteria relationship standard according to MacDonough and McNamara (% × N), and then (b) dividing this number by 54, the number of studies reviewed by Pawlicki. These adjusted figures presented in Table 3 also represent the percentages of studies which would have been acceptable according to the various criteria, using the definitions of the present authors, but independent of design-criteria considerations. The difference on each criterion between Pawlicki and the adjusted percentages is a function of the different definitions of the criterion as employed by the two different reviewers. For the three more liberal criteria, the average percentage of combined studies ($N = 51$) meeting the criteria was 39·3 per cent for Pawlicki, 60·0 per cent for MacDonough and McNamara, and 56·7 per cent for the adjusted percentages of MacDonough and McNamara. Thus, the differences in the definitions of these three criteria had minimal effect (3·3 per cent) in inflating the percentage of studies judged by the present authors to have met the criteria.

Two main implications need to be drawn from the data presented by Pawlicki and the present authors. First, regardless of the differences between these authors, both sets of data indicate that the application of experimental rigor is uneven across behavior therapy research with children. This is indeed unfortunate because current

TABLE 1. A COMPARISON OF THE CLASSIFICATION OUTCOMES PRESENTED BY PAWLICKI (1970) AND THE PRESENT AUTHORS ON DESIGN VARIABLES PRESENT IN BEHAVIOUR-THERAPY RESEARCH WITH CHILDREN (1965–1969)

	Control group		Baseline		Systematic variation of treatment		Observation unbiased		Follow-up	
	Pawlicki	MacDonough & McNamara	Pawlicki	MacDonough & McNamara	Pawlicki	MacDonough & McNamara	Pawlicki	MacDonough & McNamara	Pawlicki	MacDonough & McNamara
Azerrad & Stafford (1969)	No	NA	Yes	Yes	No	Yes	No	No	Yes	Yes
Barrish, Saunders & Wolf (1969)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Birnbrauer, Wolf, Kiddes & Tague (1965)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Blake & Moss (1967)	No	NA	Yes	Yes	No	No	No	No	TC	No
Brown & Elliot (1965)	No	NA	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Browning (1967)	No	NA	Yes	Yes	Yes	Yes	No	No	No	No
Buell, Stoddard, Harris & Baer (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Burchard & Tyler (1965)	No	NA	No	Yes	No	Yes	No	No	No	No
Bushell, Wrobel & Michaelis (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Clement & Milne (1967)	Yes	Yes	No	Yes	No	NA	Yes	Yes	No	No
Cook & Adams (1966)	No	NA	Yes	Yes	No	No	No	No	No	No
Doubros & Daniels (1966)	No	NA	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Feldman & Werry (1966)	No	NA	Yes	Yes	TU	Yes	No	No	TU	No
Ferster & Simons (1966)	No	A	No	A	No	A	No	A	No	A
Gelbert & Meyer (1965)	No	A	No	A	No	A	No	A	Yes	A
Graziano & Kean (1968)	No	NA	Yes	Yes	No	No	No	No	No	No
Hall & Broden (1967)	No	NA	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Hall, Lund & Jackson (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Hallsten (1965)	No	NA	No	Yes	No	No	No	No	Yes	Yes
Hart, Reynolds, Baer, Brawley & Harris (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Hudson & DeMeyer (1968)	No	A	No	A	No	A	No	A	No	A
Johnston, Kelly, Harris & Wolf (1966)	No	NA	Yes	Yes	Yes	Yes	?	Yes	Yes	Yes

Kondas (1967)	No	No	No	Yes	No	NA	No	No	Yes	Yes
Leitenberg, Agras & Thompson (1968)	No	NA	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Lovaas, Freitg, Gold & Kassorla (1965)	No	NA	Yes	No	Yes	Yes	No	Yes	No	No
Lovaas, Freitas, Nelson & Whalen (1967)	No	NA	No	No	Yes	Yes	No	No	TC	No
Lovaas, Schaeffer & Simmons (1965)	No	NA	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Marr, Miller & Straub (1966)	No	NA	No	No	No	No	?	No	TC	No
Martin, England, Kaprowy, Kilgour & Pilek (1968)	No	NA	No	No	No	Yes	No	No	Yes	Yes
Meichenbaum, Bowers & Ross (1968)	Yes	NA	Yes	Yes	No	Yes	No	Yes	SE	No
Metz (1965)	No	NA	Yes	Yes	No	No	No	No	No	No
O'Leary, Becker, Evans & Saudargas (1969)	No	NA	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
O'Leary, O'Leary & Becker (1967)	No	NA	Yes	Yes	Yes	Yes	?	Yes	No	Yes
Osborne (1969)	No	NA	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Patterson, Jones, Whittlier & Wright (1965)	Yes	NA	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Peterson & Peterson (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Pumroy & Pumroy (1965)	No	NA	Yes	Yes	No	No	No	No	?	No
Quay, Sprauge, Werry & McQueen (1967)	No	NA	Yes	Yes	Yes	Yes	No	No	No	No
Reynolds & Risley (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Risley & Wolf (1967)	No	NA	No	Yes	No	Yes	No	No	No	No
Ritter (1968)	Yes	Yes	Yes	Yes	No	NA	Yes	No	No	No
Schwitzgebel (1967)	Yes	Yes	Yes	Yes	No	NA	No	Yes	Yes	Yes
Sibley, Abbott & Cooper (1969)	No	NA	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Tate & Baroff (1966)	No	NA	Yes	Yes	Yes	Yes	No	No	TC	No
Turner & Young (1966)	No	Yes	No	Yes	No	NA	No	No	Yes	Yes
Tyler & Brown (1967)	No	NA	No	No	Yes	Yes	No	No	No	No
Walker & Buckley (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Ward & Baker (1968)	Yes	Yes	Yes	Yes	No	NA	No	Yes	SE	No
Wetzel, Baker, Roney & Martin (1966)	No	NA	Yes	Yes	No	No	No	No	TC	No
Wolf, Giles & Hall (1968)	Yes	NA	Yes	Yes	Yes	Yes	No	No	No	No
Wolf, Risley, Johnston, Harris & Allen (1967)	No	NA	No	Yes	No	Yes	?	Yes	Yes	Yes
Young & Turner (1965)	No	No	No	No	No	NA	No	No	Yes	Yes
Zeilberger, Sampen & Sloane (1968)	No	NA	Yes	Yes	Yes	Yes	No	Yes	No	No
Zimmerman, Zimmerman & Russell (1969)	No	NA	No	No	Yes	Yes	No	Yes	No	No

Key. A—Criteria not applied to anecdotal case reports; NA—Criteria not appropriate for the type of design used; SE—School ended; TC—Therapy continuing; TU—Treatment unsuccessful; ?—Unable to determine.

TABLE 2. PERCENTAGE OF STUDIES (COMPILED FROM TABLE 1) WHICH HAVE ADEQUATELY INCORPORATED EXPERIMENTAL CONTROLS INTO THEIR DESIGNS

Authors	Control group		Baseline		Systematic variation of treatment		Unbiased observer		Follow-up	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Pawlicki (1970)	$\frac{46}{54}$	$\frac{8}{54}$	$\frac{16}{54}$	$\frac{38}{54}$	$\frac{27}{53}$	$\frac{26}{53}$	$\frac{48}{50}$	$\frac{2}{50}$	$\frac{25}{45}$	$\frac{20}{45}$
	85%	15%	30%	70%	51%	49%	96%	4%	56%	44%
MacDonough & McNamara	$\frac{2}{7}$	$\frac{5}{7}$	$\frac{6}{51}$	$\frac{45}{51}$	$\frac{8}{44}$	$\frac{36}{44}$	$\frac{24}{51}$	$\frac{27}{51}$	$\frac{31}{51}$	$\frac{20}{51}$
(1972)	29%	71%	12%	88%	18%	82%	47%	53%	61%	39%

TABLE 3. PERCENTAGE OF STUDIES MEETING FIVE DESIGN CRITERIA, ADJUSTING FOR DIFFERENCES IN CRITERIA DEFINITION

Five criteria used in evaluation	Total no. of studies evaluated		
	Pawlicki (1970)	MacDonough & McNamara (1972)	Adjusted MacDonough & McNamara (1972)
	54	51	
1 Control group			
A			No adjustment necessary
B		71% (N=7)	
C	15%		
2 Baseline data			
A		89% (N=44)	
B		86% (N=7)	
C	70%	88% (N=51)	83·1%
3 Systematic variation of treatment			
A		82% (N=44)	No adjustment necessary
B			
C	49%		
4 Unbiased observer			
A		54% (N=44)	
B		43% (N=7)	
C	4%	53% (N=51)	50·1%
5 Follow-up			
A		36% (N=44)	
B		57% (N=7)	
C	44%	39% (N=51)	36·8%

Key. A—intrasubject designs; B—group designs; C—combined intrasubject and group designs.

behavior modification texts (Bandura, 1969; Franks, 1969; Kanfer and Phillips, 1970; Yates, 1970) clearly stress the experimental background and methods of behavior therapists. Another implication based on differences (between Pawlicki and the present authors) is the demonstration of poor agreement between judges concerning the relevance of research design as a classification factor. The use of different criteria with different designs clearly influenced the judgments of the present authors more than the differences in definition of criteria. Thus, the low reliability of judgments concerns primarily the low agreement in establishing criteria to judge the adequacy of designs, although there may well be additional "judgmental" differences in applying a given criterion. Of course, the low reliability between the sets of judges in establishing criteria and evaluating behavior therapy research does not bear directly on the question of the efficacy of behavioral techniques. However, inadequacies in designs do mean that one cannot adequately evaluate the outcomes in those studies which are methodologically deficient from a design point of view.

SUMMARY

Distorted underestimates (Pawlicki, 1970) of the scientific adequacy of behavior therapy research with children has resulted because appropriate design-criteria relationships were not considered in evaluating studies in this area. Eighty percent of the studies have appropriately incorporated the criteria of control group, baseline, and systematic variation of treatment into their designs. However, even when design-criteria relationships are considered, a number of criteria have been inadequately controlled for in a large percentage of studies. In fact, the criteria of unbiased observer and follow-up have, on the average, been controlled for in only 46 per cent of the studies reviewed. If the scientific merit of research in this area is to be accepted, then more attention to tightening controls on these variables is needed.

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ACTING-OUT BEHAVIOUR AND ITS SIGNIFICANCE FOR THE RESIDENTIAL TREATMENT OF DELINQUENTS

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INTRODUCTION

MANY kinds of residential institution attempt to bring about a lasting improvement in the social behaviour of those sent to them, but individual institutions differ widely in ways of pursuing this goal. One of the most important of these differences arises over the management of absconding, fighting, stealing and other forms of difficult behaviour in the institution. If staff see deviancy as being the result of deep emotional conflicts they may be comparatively unconcerned about such "acting-out"† or even encourage it in the hope of exploring more fundamental problems. Others, by contrast, may attempt to suppress any anti-social behaviour in the institution on the grounds that it is likely to lead to similar behaviour after release.

It is important to know whether these two different policies have different effects on the long-term behaviour of those passing through the institution, and this paper considers the problem in relation to absconding from boys' approved schools. Absconding is a particularly suitable form of difficult behaviour to study. In contrast to aggression, for example, it is comparatively easy to define, and incidents are almost always known to staff and routinely recorded. Moreover, there is a marked variation in absconding between different schools and American evidence suggests that "treatment oriented" schools, which tend to be unconcerned about absconding, have higher levels of it than more restrictive institutions (Street *et al.*, 1966). In addition, if one wants results of practical value, it is best to study forms of difficult behaviour which are known to be within an institution's power to control. Home Office Research Unit studies of probation hostels (Sinclair, 1971) and approved schools (Clarke and Martin, 1971) have shown that differences in the absconding rates of institutions are more related to environmental factors within the institution than to differences in intake. Some of these factors at least are within the control of the institution.

Clarke and Martin (1971) have already produced evidence suggesting that absconding increases a *boy's* likelihood of re-offending following release. It does not necessarily follow from this that *institutions* which have high levels of absconding will generally be less effective than others. It could be that for successful training to

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† The use of "acting-out" in this paper as a synonym for any difficult, deviant, or anti-social conduct that appears to be motivated by anxiety, follows the common usage that this psychoanalytic term has latterly fallen into amongst residential workers and others (see West, 1967, p. 152).

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take place, those subject to training must first reveal their deep-seated problems, and this may require an institution to allow a certain amount of "acting-out" including absconding. Whereas most of the residents might benefit from such a policy, a minority, for instance those who demonstrate a basic inability to deal with personal problems, might be harmed by it. In order to shed light on this problem, the overall absconding rates of individual approved schools were compared in the present study with their "success rates" (see below) while some selected factors relating to the intake were statistically controlled. These factors were I.Q. and number of previous court appearances, and much depends on whether it was adequate to control only these. This point is therefore considered in detail later in the paper.

Approved schools are residential establishments which at the time of the research dealt largely with young delinquents sent there by the courts (see *Sentence of the Court*, Home Office, 1969). The schools vary in size and organisation, and in the religious persuasion and age of those admitted (junior schools taking boys aged under 13, intermediate schools boys aged 13 and 14, and senior schools from 15 to 17) as well as in a great many less tangible matters such as the policy of the headmaster or the practices of staff. They have no secure perimeter (the traditional view being that most boys respond best to treatment under open conditions) and it is not difficult for boys intent on absconding to run away.

APPROVED SCHOOL ABSCONDING AND SUCCESS RATES

Before describing the methods and results of the study some description of absconding and success rates is necessary. Both these rates were routinely produced for a number of years by the Home Office until the approved schools became the responsibility of the Department of Health and Social Security in 1971. Overall success rates were published, but the absconding and success rates of individual schools were provided for internal Home Office use only. Absconding rates are arrived at by expressing the number of boys who have participated in any incident of unauthorised absence from the school in each half-yearly period as a percentage of the average number of boys in the school during the period. (For this research a yearly absconding rate for 1964 was obtained by averaging the January–June and July–December figures.) Success rates are calculated as the percentage of boys released on after-care from the school in each year, who are not found guilty of any offence within three years of leaving. For further details concerning the calculation of success rates see the *Report on the Work of the Children's Department, 1964–66* (Home Office, 1967).

It has been shown previously (Clarke and Martin, 1971) that schools with high absconding rates at one time tend to have similarly high rates at another. The preparatory work for the present research showed a similar consistency in the success rates of individual approved schools since the analyses of concordance for the success rates of junior, intermediate, and senior schools during the eleven years 1954–64 yielded highly significant values of Kendall's W. The number of schools included in the study and the values of W are given below:

Junior Schools ($\mathcal{N} = 21$), $W = 0{\cdot}20$ [$\chi^2 = 43{\cdot}78$, 20 $d.f.$, $p < 0{\cdot}01$]
Intermediate Schools ($\mathcal{N} = 22$), $W = 0{\cdot}23$ [$\chi^2 = 53{\cdot}82$, 21 $d.f.$, $p < 0{\cdot}001$]
Senior Schools ($\mathcal{N} = 20$), $W = 0{\cdot}34$ [$\chi^2 = 70{\cdot}89$, 19 $d.f.$, $p < 0{\cdot}001$]

Those schools which had not been in operation throughout 1954–1964 were excluded. In addition it was decided to exclude the Roman Catholic schools since they had for the most part operated outside the normal approved school classifying system. Standardised information on intelligence, which was necessary for the study reported below, was not consistently available for boys at these schools.

METHOD AND RESULTS

The relationship between the amount of absconding from a school and its "success" was assessed by correlating the success rates of the boys discharged from individual schools in 1965 (the most recent year for which figures were available) and the absconding rates for the same schools in 1964, when almost all of those discharged in 1965 were likely to have been in residence. In carrying out the analysis, account was taken of the fact that some schools receive boys with a higher risk of reconviction than do others. For this purpose, information available in the Home Office Statistical Branch was used to calculate the mean I.Q. (intelligence was assessed by approved school psychologists using standardised tests) and the mean number of previous court appearances of boys discharged from each of the schools in 1965. The intelligence of a boy is known to be important in the decision about where he is to be trained and prior analysis of the data had indicated a relationship between I.Q. and likelihood of reconviction following discharge (although this has not always been found in previous research, see Sinclair and Clarke, in preparation). Number of previous court appearances is known to be a powerful predictor of reconviction among approved school boys as it is indeed among other delinquent groups (see *Sentence of the Court*, Home Office, 1969).

The Appendix sets out the basic data on which the calculations were made. In order to avoid identifying individual schools, the numbers of boys in each school are not given. The mean monthly population of individual schools (used in calculating absconding rates) varied, however, in 1964 from 41·6 to 129·3 in senior schools, from 45·5 to 141·9 in intermediate schools, and from 21·8 to 131·0 in junior schools. Numbers of boys released on after-care from individual schools in 1965 (on which success rates were based) varied from 21 to 96 in senior schools, from 25 to 98 in intermediate schools, and from 5 to 57 in junior schools. (The relatively small number of boys in the junior schools may account for their greater variability in success rates). The total number of boys released in 1965 from the schools included in the study was 3123.

Table 1 gives the product-moment correlations between the measures of intake (I.Q. and previous court appearances) and each school's absconding and success rates. The final row in Table 1 gives the correlation between absconding and success rate with mean I.Q. and previous court appearances held constant. Inspection of the data showed it was unnecessary to transform scores before calculating coefficients as they were approximately normally distributed, but the analysis of intermediate schools was carried out both with and without school No. 22, as it had extreme scores on three of the four variables (absconding, I.Q., and previous court appearances) included in the study—the correlations in brackets represent calculations carried out after omitting school 22. It can be seen that the effect of its inclusion on some of

TABLE 1. CORRELATIONS BETWEEN MEASURES OF INTAKE, ABSCONDING, AND SUCCESS RATES

	Senior	Intermediate		Junior
Absconding vs. success rate	−0·41	−0·10	(−0·35)	−0·39
Absconding vs. I.Q.	−0·13	0·53*	(−0·19)	−0·13
Absconding vs. previous court appearances	−0·13	−0·52*	(0·01)	−0·46*
Success rate vs. I.Q.	0·58†	0·21	(0·19)	0·21
Success rate vs. previous court appearances	−0·46*	−0·35	(−0·36)	0·34
I.Q. vs. previous court appearances	−0·32	−0·59†	(−0·25)	−0·05
Partial correlation of absconding and success rate	−0·51*	−0·37	(−0·36)	−0·25

* $p < 0{\cdot}05$. † $p < 0{\cdot}01$.

the correlations is very marked—sufficient to change that for absconding and I.Q., for example, from weakly negative to significantly positive. The differences in correlation coefficients between the three types of school appear quite marked in some cases, but when a test for equality of correlations (see Snedecor and Cochran, 1967, p. 186) was applied, only those for absconding with I.Q. and success rate with previous court appearances were significantly different at the 5 per cent level. An explanation of these differences must await further research—the finding that the expected relationship between the previous court appearances of the intake and the success of the school does not hold for junior schools is particularly puzzling. On the face of it, it suggests that junior schools can have an especially powerful effect on the subsequent progress of their charges or, possibly, that boys in junior schools with few previous offences have particularly bad home backgrounds which lead the courts to commit them.

The fact that the three types of school differ significantly in some of the correlations presented in Table 1, does not materially affect the nature of the partial correlation between absconding and success: in all three cases this is negative, although it is statistically significant only for the senior schools. It is not surprising that the relationship is strongest for senior schools since it is in these schools that absconding rates are highest. The pooled value of the three partial correlations is, however, highly significant (−0·38, $p < 0{\cdot}01$).

The results given above do not prove that absconding leads to reconviction since the correlation could have arisen because of some characteristic of intake (other than I.Q. and previous court appearances) which had not been taken into account and which predisposes boys to absconding as well as to failure. We do not think that differences in intake account for the relationship between absconding and reconviction found in the study but, since it is a crucial point, it is worth laying out the evidence in full. As far as selection is concerned, apart from intelligence and the previous convictions of the boys, there is no solid evidence that approved schools vary greatly in the quality of their intakes with respect to likelihood of reconviction. At the beginning of 1964, a policy of geographical allocation was introduced to cover most approved schools which meant that, with occasional exceptions to meet special needs, boys were sent to the approved school for their particular age-group nearest to their homes—a policy which would be likely to reduce the chances of schools receiving intakes with greatly varying risks of reconviction.

Secondly, as mentioned above, previous research has shown that absconding is largely unrelated to personal factors and is mainly determined by the environmental pressures experienced in the school. While there is insufficient space to give the evidence concerning the part played in absconding by institutional environment, it is important to summarise the evidence concerning the relatively small part played by personal factors: Sinclair, after examining some thirty variables concerned with the boys admitted and their backgrounds, concluded that the large differences he found in absconding rates between probation hostels were not related to differences in intake. More relevant in the present context, perhaps, are Clarke and Martin's (1971) conclusions from studies in which boys who absconded from approved schools were compared with those who did not. Included in the studies they undertook or whose results they reviewed were a very large number of variables related to the boy's personal characteristics (e.g. age, height, weight, intelligence, reading age), his home background (broken home, area of residence, type of accommodation, number of siblings, criminality or mental illness in family, etc.), delinquency history (number of previous court appearances, age at first court appearance, type of current offence, previous disposals), psychiatric history (e.g. enuresis, referral to Child Guidance Clinic, psychiatric diagnosis), and school and work record (truancy, number of jobs held, type and number of schools attended, etc.). In addition they undertook a series of investigations into personality, during the course of which they used a specially developed Osgood Semantic Differential as well as the following standardised tests: Junior Maudsley Personality Inventory, the Gibson Spiral Maze, the Jesness Inventory, Cattell's High School Personality Questionnaire, and the Junior Eysenck Personality Inventory. Out of the very wide range of variables encompassed by this research only two factors were consistently found to be related to the likelihood of becoming an absconder: absconders had somewhat worse delinquency records and, related to this, they were more likely to have a history of absconding from some other residential placement.

Number of court appearances is a good index of delinquency record and, of course, was controlled in the present study. Moreover, it is important to note that in the present study the relationship between a school's absconding rate and the mean number of previous court appearances of intake was *negative*, i.e. the schools which received worse intakes in terms of previous court appearances had lower absconding rates (see following paragraph). This means that if some uncontrolled factor of intake is leading to both high absconding and low success rates it would probably be negatively correlated with previous court appearances. In view of all the evidence to hand, we think it extremely unlikely that there is any such factor and, for all the reasons given above, we think that the explanation for the inverse relation between absconding and success rates does not lie in uncontrolled variables of intake.

The negative correlation (see Table 1) between a school's absconding rate and mean number of previous court appearances among boys admitted is surprising, and it must be discussed further. The association does not in fact arise through a lesser tendency among those with many previous court appearances to abscond. If anything the reverse was the case. When the association *within* schools is examined, Clarke and Martin's results are repeated; those with three or more previous court appearances are more likely to abscond than those with two or less (this division giving the nearest to an equal split in number); in fact, if the results for individual schools are amalgamated using Cochran's procedure (Maxwell, 1961), there is only a probability of one in ten that the pattern could have arisen by chance. Thus the correlation between mean number of previous court appearances and absconding rates arises not because boys with a high number of previous court appearances tend not to abscond, but because schools which receive boys with a high number of previous court appearances tend to have low absconding rates. The explanation may well be that schools receiving very delinquent populations adapt themselves to this and are more concerned than some others to reduce delinquent behaviour in the form of absconding. In support of this there is some evidence from the study of approved schools being undertaken by the Dartington Research Unit into the Sociology of Education (Millham, S. L., personal communication) that the schools taking a high proportion of boys with many previous court appearances are run differently from those with less delinquent populations. Whatever the explanation of the present findings, they do not suggest that schools with low absconding rates have "easier" intakes.

DISCUSSION

As mentioned above, preliminary work for the present study showed that an approved school has similar success rates, just as it has similar absconding rates, at different periods of time. Both rates may, therefore, be considered as reasonably stable attributes of the institution. It was also shown in the present paper that a school's absconding rate is negatively correlated with its success rate. The correlation remains if two measures of intake, mean I.Q. and mean number of previous court appearances, are held constant, even though these two measures are highly associated with reconviction. The results are consistent with unpublished findings of Wilkins (see Clarke and Martin, 1971) who found it impossible to get an efficient predictor of reconviction for the approved school boy population using background variables alone and without taking absconding into account.

Since previous research has shown that absconding is largely a product of school environment, the present findings can be interpreted as evidence of a long-term effect of the school on its boys. This may be the most important conclusion to the study in view of the general failure of previous penological research to show any lasting effects of institutional treatment. We do not wish to take up a great deal of space in attempting to explain why we appear to have found a "treatment" effect while others have not, except to suggest that the reason may well lie in the fact that we were able to make comparisons between a large number of treatment regimes (i.e. 3 × 22 approved schools) within a single study. Under these conditions small differences in success rates may be identified and related to differences in regimes in a way that is not possible when only two or three separate treatment settings are studied (as is much more often the case in evaluating penal treatments). This is particularly likely to be so when there are theoretical reasons for expecting the treatment variables studied to be related to "success".

We think it important to discuss here, however, the way in which the "treatment" effect may occur. Since previous findings referred to above have suggested that a boy's chances of being reconvicted after release are increased by absconding, it is permissable in what follows to formulate the discussion in terms of the effect on individual boys. There seem to be two main problems, the first, which again will not be discussed in detail, concerns the source of the deviant behaviour in the institution. As far as absconding is concerned (the immediate discussion will be confined mainly to absconding), we would follow Brierley and Jones (unpublished) in suggesting that a state of anxiety might be the main motivating factor but, as suggested by the Home Office research studies quoted earlier, we would place more emphasis on the role of the institution in giving rise to anxiety and would draw attention to the possibility that some absconding is impelled by pleasure-seeking alone. We would also stress the importance of the staff's reaction to absconding as a determinant of its overall level.

The second problem concerns the mechanism by which absconding behaviour within the institution becomes associated with delinquency outside and we suggest that this may occur through a process of learning and generalisation. Clarke and Martin (1971) have already considered the evidence that absconding can be learned, but there is a need to examine more closely the way in which the learning of absconding leads to the expression of further delinquent behaviour. It is more difficult to see how this occurs with absconding than with some other kinds of deviant behaviour arising within the institution. Viewed as a physical activity, absconding is very different from breaking into a house, taking and driving away a car, or other delinquent acts* and it would seem that the connection between it and later delinquency most probably arises because both activities are implicitly associated in the minds of boys with some concept of deviancy. (How far such an implicit association is a reflection of staff attitudes would be an interesting study.) If absconding generalises to further delinquency in this way it is very likely that other forms of deviant conduct in the institution, such as fighting or stealing, generalise both to each other, to absconding, and to subsequent reconvictions. Thus institutions with high levels of absconding are likely to have high levels of other forms of deviant conduct and the relationship between absconding rates and reconviction rates may exist partly because of a more general relationship between absconding rates and "deviant conduct" rates.

If the foregoing argument is correct, it suggests that a high level of deviancy in the institution usually leads not to the resolution of fundamental problems, but simply to a high level of deviancy out of the institution, and that the encouragement of acting-out is not a desirable strategy. But there must be some caution in drawing conclusions from the present results. It could be argued, for example, that although some schools are not greatly perturbed by absconding few welcome it, and to speak of the encouragement of acting-out behaviour may be too positive a way of describing a situation that more often arises by default. Also, institutions in which staff were trained to accept absconding as a "therapeutic" opportunity and to react appropriately, might possibly benefit from a certain level of "acting-out". Senior school No. 20, intermediate school No. 16, and junior school No. 19 (see Appendix) might be institutions of this kind. In spite of difficult intakes and high absconding rates, these schools nevertheless achieved relatively good success rates.

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* Absconding may of course involve these activities, but Sinclair (1971) found that boys convicted of an offence committed while absconding were not more likely to be subsequently re-convicted than other absconders. The connection between absconding and later reconviction does not therefore seem to arise simply because absconders tend to commit offences while absconding.

A closer study of the regimes of schools such as these, which appear to deviate from the general rule that absconding is harmful, would be worth undertaking as part of a wider study of the differences between schools with high absconding rates and those with low. Such a study might look at variables of regime and organisation, staffing ratios, quality of staff and relationships between staff groups, differing policies with regard to the involvement of the boy's home and the wider community in treatment, as well as many other factors which might be thought to be of importance.

As far as practical implications are concerned our findings, though not conclusive, seem more closely compatible with some treatment strategies than others. A logical extension of the present argument would be that institutions, such as approved schools, should first of all aim to provide a general therapeutic atmosphere and so reduce the apparent motivation for much deviant conduct in the institution. Secondly, they must operate on the deviant behaviour itself to prevent the acquisition and reinforcement of specific deviant habits and the strengthening of a generalised delinquent orientation (see Bandura, 1970).

In conclusion, it must be stressed that a number of steps in the argument have the status only of hypotheses to be tested by further research and it has by no means been proved that a policy of allowing "acting-out" is mistaken—but on the evidence at present available this would seem to be so.

SUMMARY

A measure of "acting-out" behaviour in the form of absconding, together with measures of the effectiveness of treatment and quality of intake, were obtained for 66 boys' approved schools. Using correlation techniques it was shown that schools with high levels of absconding were less effective than might have been expected from the standard of their intake (as measured by I.Q. and number of previous court appearances). It was suggested that on the evidence presented "acting-out" in general is not to be encouraged, although clearly further investigation is required.

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AN INVESTIGATION OF THE ROLE OF MATCHING AND MISMATCHING FRAMEWORKS UPON THE DISCRIMINATION OF DIFFERENTLY ORIENTATED LINE STIMULI IN YOUNG CHILDREN

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YOUNG children up to the age of about 6 yr typically perform poorly on tasks requiring discrimination between different orientations of the same basic form (Fellows, 1968). Thus, in learning to read young children easily confuse b with d, m with w, and so on. In recent years a good deal of research has focussed upon the child's ability to discriminate between differently orientated line stimuli. For example, Rudel and Teuber (1963) reported that whereas children below the age of 6 yr were able to learn to choose either a horizontal or a vertical line in a two-choice discrimination task, they failed to learn the task when the choice was between two mirror-image oblique lines. This result was interpreted by Rudel and Teuber as indicating a failure in the child's perception of the two obliques. However, in addition to perceiving differences between the two stimuli such a task also involves the child in remembering from one trial to the next which of the two stimuli is the 'correct' one. Over and Over (1968) presented evidence to suggest that the child's failure on the obliques discrimination was, in fact, due to a memory deficit rather than a perceptual one. They found that young children were able to perform the task involving obliques successfully provided a sample 'correct' stimulus was on display as a reminder of which line to choose. To perform such a task the child must have been able to detect the difference between the obliques. Without the reminder the child's performance was poor. In a similar way a child may be able to detect that b and d are not the same, but still be unable to remember which is 'bee' and which is 'dee'.

Recently, Bryant (1969) has offered an alternative explanation of these findings. In his view the child codes the line stimuli in terms of whether or not they match other lines in the immediate visual field. So, in the type of task used by Rudel and Teuber the horizontal–vertical discrimination should be easy since both lines match different sides of the cards on which they are printed: the horizontal line matches the top and the bottom and the vertical line matches the left and the right sides. However, the obliques discrimination should not be easy since neither oblique line matches any other feature in the immediate visual field; hence, both the oblique lines will produce 'mismatch' signals for the child and will not be discriminated. In the Over and Over task the existence of the 'reminder' stimulus would enable one of the obliques to be matched and so make the discrimination possible.

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From Bryant's match–mismatch hypothesis, a number of predictions can be made about the effects of different types of frameworks upon the ability of children to discriminate differently orientated lines. For example, the presence of a diamond framework should facilitate the discrimination of mirror-image oblique lines since the lines would now match different parts of the framework. Bryant (1969) tested this prediction in a delayed matching-to-sample task with 30 5-yr old children. In this experiment the oblique lines were presented either isolated on a 7 in. square card, or in a square or a diamond framework in which the left and right sides of the square, and the top sides of the diamond were coloured, one red the other blue. One line was presented as a sample for 5 sec and then removed. Following a 5 sec delay two other lines were presented, one the same as the sample, the other its mirror-image. The child's task was to indicate which of the two choice lines was the same as the sample. Bryant found that the probability of a correct choice rose above chance only when the oblique lines were presented in a diamond framework. This confirms the prediction from the match–mismatch hypothesis.

It is the purpose of this present study to attempt to replicate this finding and to test two further main predictions from the match–mismatch hypothesis. The first prediction is that horizontal and vertical lines presented in a diamond framework should be less easy to discriminate than the same lines in a square framework, since the former should produce only 'mismatch' signals whereas the latter should produce different 'match' signals. Secondly, horizontal and vertical lines in a diamond framework should be no easier to discriminate than oblique lines in a square framework, since both will produce only 'mismatch' signals. A subsidiary prediction is that oblique lines within a coloured diamond framework should prove no easier to discriminate than the same lines within a non-coloured framework, since there is no formal provision in the hypothesis for anything other than a matching framework. Table 1 shows a summary of the line-framework combinations used in the present experiment together with the predicted signals from the match–mismatch coding process. From this Table it can be seen that the match–mismatch hypothesis would predict that Tasks *B* and *C* would produce chance responding and that Tasks *A*, *D* and *E* would produce successful performance.

TABLE 1. STIMULUS FRAMEWORK COMBINATIONS OF THE 5 TASKS AND PREDICTED SIGNALS

Task	Stimulus	Framework	Predicted signals
A	Horizontal	Square	Match: top/bottom
	Vertical	Square	Match: left/right
B	Horizontal	Diamond	Mismatch
	Vertical	Diamond	Mismatch
C	Oblique (45°)	Square	Mismatch
	Oblique (135°)	Square	Mismatch
D	Oblique (45°)	Diamond (coloured)	Match: red/bottom right
	Oblique (135°)	Diamond (coloured)	Match: blue/bottom left
E	Oblique (45°)	Diamond	Match: top left/bottom right
	Oblique (135°)	Diamond	Match: top right/bottom left

METHOD

Subjects. Fifty primary school children ranging in age from 4 yr 10 months to 5 yr 11 months served as subjects for the present experiment. Their mean age was 5 yr 3 months.

Apparatus. The line stimuli and frameworks were drawn upon 20 7-in. square white cards. There were two copies of each of the ten line-framework combinations, one to use as a sample and one as a choice. The lines were drawn in black ink in the centre of the cards and measured 3 in. in length. The frameworks were $4\frac{1}{2}$ in. square. All lines were $\frac{1}{4}$ in. wide. In two of the diamond frameworks enclosing oblique lines the upper lines were coloured, one red and one blue (Task *D* in Table 1). All other frameworks were drawn in black ink. The stimulus cards were presented to the child on top of a screen 12 in. high which was between the child and the experimenter.

Procedure

Pretraining. Each child was first trained on a picture orientation task to a satisfactory level of competence, before being transferred to the line discrimination task. In this, the child was presented with a picture of an animal in a certain orientation as a sample. The picture was removed and replaced by two more pictures, one of which was identical to the sample and the other which had the animal orientated differently (e.g. upside-down, facing the other way). The child was asked to choose the picture which was the 'same way round' as the sample. Feedback was given liberally to the child in order that he should quickly grasp the nature of the task. Not until the child consistently chose the appropriate picture was he transferred to the discrimination task. Only one child, in fact was rejected for failing to attain a satisfactory standard on the pre-training task.

Line discrimination. The whole range of stimulus cards was first shown to the child and he was directed to notice the enclosed lines and how some were a different way round to others. In each case the sample was presented for 5 sec, then removed and 5 sec later the two choice cards were presented to either side of where the sample had been at the top of the screen. The child was instructed to point to the card which was exactly the same as the sample. Each of the 5 discrimination tasks (see Table 1) was presented 4 times to each child in blocks of 4 trials. In each block of trials each stimulus card appeared twice as the sample. The order of each stimulus was varied between blocks. The order of presentation of the 5 tasks was systematically varied between subjects. The position of the correct choice, to the left or to the right, was determined by a chain of chance stimulus sequences for 2-choice discrimination tasks (Fellows, 1967).

RESULTS

TABLE 2. NUMBER OF SUCCESSFUL PERFORMANCES

		Tasks				
Success on	*N*	*A*	*B*	*C*	*D*	*E*
All tasks	12	12	12	12	12	12
Some tasks	28	25	19	2	6	4
No tasks	10	0	0	0	0	0
Total	50	37	31	14	18	16

For the analysis shown in Table 2 we adopted the criterion that to perform successfully on any task the child must respond correctly on all 4 trials of that task. Table 2 shows that overall, 12 children performed successfully on all 5 tasks and 10 children failed on all 5 tasks. A breakdown of the performances of the remaining 28 children shows a high success rate on Tasks *A* and *B* and a low, near chance rate (which is about 2) on Tasks *C, D* and *E*. Application of the Cochran *Q* Test (Siegel, 1956) to the data indicated a very low probability of it being a chance distribution ($Q = 95{\cdot}26$, $d.f. = 4$, $p < 0{\cdot}001$). Application of the McNemar Test (Siegel, 1956) to the different tasks showed the following comparisons to be significantly different from chance at less than the 0·001 probability level: *A* and *C* ($\chi^2 = 19{\cdot}36$), *A* and *D* ($\chi^2 = 17{\cdot}05$), *A* and *E* ($\chi^2 = 19{\cdot}05$), *B* and *C* ($\chi^2 = 11{\cdot}25$), *B* and *D* ($\chi^2 = 11{\cdot}08$) and *B* and *E* ($\chi^2 = 13{\cdot}38$). All other comparisons fell well below the 0·05 probability level.

Alternatively, the results may be analysed in terms of the mean number of correct choices as they were in Bryant's (1969) paper. When this is done the following mean values are obtained over the five conditions for all 50 *S*'s, where the maximum score is 4 and the chance score 2: $A = 3{\cdot}36$, $B = 3{\cdot}24$, $C = 2{\cdot}36$, $D = 2{\cdot}46$, $E = 2{\cdot}42$. A two-way analysis of variance yields a significant between conditions source of variance ($F = 14{\cdot}5$, $p < 0{\cdot}01$). Application of the Scheffé method for the multiple comparison of means (Edwards, 1968) indicates that all differences exceeding 0·57 can be judged to be significant at the 0·05 probability level. The significant comparisons are *A* and *C*, *A* and *D*, *A* and *E*, *B* and *C*, *B* and *D*, and *B* and *E*, which are the same as those produced by the first analysis.

DISCUSSION

The results of the present experiment have clearly failed to substantiate Bryant's (1969) finding that the presence of a coloured diamond framework facilitates the discrimination of obliques. There was no significant difference between Tasks *C* and *D*, both producing near chance performance levels. Also, the results failed to confirm the two major predictions derived from the match–mismatch hypothesis. The *first* prediction was that the horizontal–vertical discrimination would be more difficult to make when the lines were enclosed by diamond frameworks than when they were enclosed by square frameworks. This prediction was not confirmed as there was no significant difference between the performance levels on Tasks *A* and *B*, though there was some *tendency* for more failures to occur on Task *B* than on Task *A* which is what the hypothesis would predict. The *second* prediction was that the horizontal–vertical discrimination with a diamond framework should be no easier than the oblique discrimination within a square framework. This prediction, too, was not confirmed as Task *B* was performed significantly better than Task *C*. The subsidiary prediction was that the presence of colour cues should make no difference to the ease of discriminating between obliques in diamond frameworks. This prediction was confirmed since the performance levels on Tasks *D* and *E* did not differ significantly. The real significance of this finding, however, is reduced by the fact that the performance on neither of these two tasks was above chance level, which is not what was expected from the match–mismatch hypothesis.

The results of the present study point very clearly to the conclusion that the main factor influencing the difficulty of the discriminations on the 5 tasks was the absolute orientation of the line stimuli, and not the presence or absence of matching lines in the immediate visual field. Tasks *A* and *B* which involved the discrimination of horizontal and vertical lines were significantly easier for the young children in the present study than Tasks *C*, *D* and *E* which involved the discrimination of mirror-image obliques. Neither the horizontal–vertical discriminations, nor the oblique discriminations was significantly influenced by the presence of matching or mismatching frameworks. One possible objection to this conclusion is that the frameworks were not the only features of the visual field which could have provided matching cues for the line stimuli; there were also the sides of the cards, the edges of the screen on which the cards were presented, the corners of the room, and so on. Thus, it could be argued that the failure to confirm the first prediction, that the horizontal–vertical discrimination with a diamond framework (Task *B*) would be less easy than the same discrimination with a square framework (Task *A*) was due to the utilization in Task *B* of other matching cues outside the diamond framework. The fact that there was some tendency for Task *B* to be performed less well than Task *A* could therefore be interpreted in terms of the relative prominence of the matching cues in the two conditions. One way to solve this problem more definitively would be to present the lines and frameworks as luminous figures in an otherwise dark room. Under these conditions the horizontal–vertical discrimination with a diamond framework should prove impossible to any child exclusively using a match–mismatch perceptual code. That this would probably increase the difficulty of discrimination is suggested by the work of Witkin *et al.* (1954) with the luminous rod and frame test. Witkin found that certain adults and young children, whom he referred to as "field-dependent", experienced considerable difficulty in aligning a central rod (or line) to the vertical or horizontal when the square frame was tilted one way or the other (i.e. so that the line no longer matched any one side of the frame). However, the fact that the majority of adults (who are "field independent") succeed in aligning the rod correctly to the vertical or the horizontal, clearly indicates the existence of cues other than those in the visual field to support the judgment. These clearly include bodily orientation and the force of gravity. Thus, success on the luminous figure horizontal–vertical discrimination with a diamond framework could indicate the child's ability to utilize cues other than those in the immediate visual field.

The point that there may be other matching cues in the visual field than the immediate framework does not, however, help to explain the failure to replicate Bryant's finding that the discrimination of obliques was facilitated by the presence of a diamond matching framework, even when both top sides of the diamond were coloured, one red and one blue. One possible explanation may be that for some reason the children in the present experiment were not utilizing the matching framework cues. One reason for this may lie in the nature of the pretraining given to the children. Bryant's report indicates that the subjects received "pretraining in recognising the framework that would be used during the experimental session". It is likely that this pretraining was so designed as to draw the child's attention to the matching frameworks. In the present study no such intention was present since it was thought that such efforts might be prejudicial to the results of the experiment. Each child was simply trained to select a choice picture which was 'the same way round' as the previously presented sample picture. No mention was made of the frameworks, neither during pretraining, nor in the main experiment. It appears very likely that the difference in subject preparation in the two experiments was responsible for the difference in subject performance. What this also means is that many young children do not *spontaneously* adopt a match–mismatch code in this type of discrimination task. Rather, it appears that this should be regarded simply as one strategy which young children may utilize when they are faced with a difficult orientation discrimination. But whether or not they do use it, depends upon the way the task is presented to them. Huttenlocher (1967) has also found that young children may utilize such a matching strategy in orientation discrimination tasks. But this is certainly not the only strategy that might be used. Jeffrey's (1958, 1966) work shows the great effectiveness of response-based rather than stimulus-based strategies. For example, in one study Jeffrey (1966) showed how 4 yr old children could be helped to perform successfully on an allegedly 'impossible' obliques discrimination learning task of the sort used by Rudel and Teuber simply by pretraining them to press a button in the direction in which the obliques were pointing. One might say that what is being transferred in this case is an abbreviated or 'internalised' representation of the original pointing response (see Piaget and Inhelder, 1956). Observation of a child's mediating behaviour during orientation discrimination tasks provides many examples of the spontaneous usage of such motor strategies (e.g. finger movements, head movements and postural adjustments).

Bryant has criticised Over and Over's (1968) emphasis on the role of memory in discrimination tasks. But even in so-called 'simultaneous' presentation tasks, the stimuli are never strictly speaking simultaneously available; they have to be fixated one at a time and changes in fixation points takes time. Hence, the comparison always involves the representation of at least one of the stimuli. Clearly, if the two stimuli are close together the holding time is less, but evidence from other work suggests that delays of more than a quarter of a second inevitably involve some non-iconic representation process (Neisser, 1967).

SUMMARY

In a delayed matching-to-sample experiment with 50 5-yr old children it was found that the presence of square or diamond frameworks did not significantly effect the discriminability of horizontal and vertical lines, nor that of mirror-imaged oblique lines, though performance on the former was significantly better than on the latter. These results indicate that young children do not, as Bryant (1969) proposed, spontaneously adopt a match–mismatch perceptual code on this type of task. It appears that the child's problem is to find some way of representing the sample stimuli in their absence. Whether the child uses a matching code, or a mediating response, or nothing, seems to depend mainly upon the way he is prepared for the task.

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THE STUDY OF INFANT-ENVIRONMENT INTERACTION: SOME COMMENTS ON TRENDS AND METHODOLOGIES

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INTRODUCTION

1. *Interaction*

"Interaction" has been one of the most evasive and misused concepts in the literature of Developmental Psychology. Typically "mother–child interaction" has been interpreted as the effect that certain variations in maternal behaviour and attitudes have on the behaviour of the child (e.g. Sears, Maccoby and Levin, 1957; Bayley and Schaefer, 1964; Caldwell and Hersher, 1964; Freeberg and Payne, 1967; Rubenstein, 1967; Brody, 1969; Stern *et al.*, 1969; Lewis and Goldberg, 1969; Moss, Robson and Pedersen, 1969).

An adequate investigation of "interaction" requires that we study not the operation of an organism upon an environment, nor the environment on an organism but rather itself as an event. Yet, as Ittelson and Cantril (1954) suggest in introducing the transactional approach to the study of perception, this point of view is foreign to our common sense view of things. We tend to look at objects and people as entities existing in their own right and we encounter some difficulties when the event we have to study is neither one entity (organism) nor the other (environment) but rather the interaction between them. This common sense view of things may be necessary for our daily activities but it is not adequate for a scientific understanding of the process involved in infant–environment interaction.

It could also very well be that the difficulties most psychologists have with the concept of "interaction" are embedded within their general scientific and conceptual framework. The majority of child psychologists of the last 50 years operated with a model of man described by system-theorists as a closed system (Hall and Fagen, 1956), a model based essentially on classical physics and chemistry. The concept of "interaction" requires essentially operations with a model of *open* systems. Shifting from thinking in terms of one type of system to another, requires changes in basic methodological conceptions and the understanding of the nature of explanation (Ashby, 1965). One cannot have a model of the infant as a Tabula Rasa to be shaped by its environment and study infant–environment *interaction* at the same time. The term "interaction" basically means not only *A*'s reactions to event class *B*, but also the effects of these reactions on *B*'s later output and the effect of that output on *A*, etc.

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The study of infant–environment interaction should essentially involve the investigation of the patterns of interaction between the infant and his social and/or non-social environment. Thus, the study of infant–caretaker interaction entails research into *the changing pattern of the mutual perceptions and behaviours of both infant and caretaker vis-a-vis each other as a result of their respective previous mutual perceptions and behaviours vis-a-vis each other.* Similarly, the study of the interaction between the infant and his non-social environment should consist of the investigation of the changing pattern of mutual input and output of both, as a result of their respective previous mutual input and output.

This latter conceptualization is probably harder to understand, yet in principle, we are dealing here with the same process as in the case of social interaction. One can discuss the differences in the interaction patterns of "infant-moves-head-mobile-moves-90°-infant-moves-head" and the pattern "infant-moves-head-mobile-does-not-move-infant-moves-head", as an example of a non-social interaction (Watson and Ramey, 1969). A statistical model that can represent this concept of "interaction" consists of a series of conditional probability statements. It has been recently suggested that a Markov model may handle adequately some mother–infant interaction data (Haupt and Gewirtz, 1968; Lewis, 1971; Bateson, 1971). Questions answered by such a model are of the following type: what is the probability of mother's vocalization when it follows her own vocalization and when it follows her infant's vocalization? (Bateson, 1971); or, what is the likelihood of a mother responding to infant's vocalization by holding him, vocalizing back to him? And given this probability, what is the likelihood of the infant's smiling following handling and/or vocalization of the mother? According to this model, interaction is seen as a chain of events with probability estimates prefixed to each event, depending on the probability of the preceding event (the model can be extended to deal with time variables as well).

2. *Infant and environment*

(a) *Infant.* Our concept of infant follows fairly closely the suggestion made by Rheingold (1969). The infant is seen from day one onward as an active live organism that is capable of deriving information from its environment, processing that information, and taking action as a function of the processing of that information.

(b) *Environment.* Our concept of environment includes both social and non-social environment. Although this writer does not accept that the basic processes involved in the interaction between the infant and his social environment are any different from those involved in his interaction with his non-social environment, the distinction is introduced here in order to facilitate the discussion of research into infant–environment interaction to the present day. It is obvious that the delineation of the two categories (social environment and non-social environment) is not always clear (e.g. the child follows with his eyes the moving hand of the mother, and/or a moving toy). One cannot state in any meaningful way that the former constitutes a social interaction whilst the latter constitutes a non-social interaction. Yet the distinction has its usefulness in organizing current literature and in dealing with more complex interactions.

One interesting question that the research into infant–environment interaction can and should answer is whether there is a consistent difference in patterns of interaction with social as opposed to non-social environment. Another interesting question is the degree of independence between the patterns of social and non-social interactions in the environment of any given child. Yarrow (1963) has suggested that the mother can mediate in the interaction between the infant and his non-social environment; she gives him the toys, she models her behaviour in a strange room, she reinforces his kicking the ball. Other researches have hypothesized that it is not only the level of stimulation in the child's non-social environment that may effect his development but also the mother's verbal structuring of this non-social environment (Hess and Shipman, 1965).

This is only one possible interaction. However, this brings us into the domain of higher order interactions (interaction between two patterns of interaction) which our present methodological skills have difficulty in handling.

The history of research into infant–environment interaction reflects asymmetrical interest in the interaction between the infant and his social environment, or more specifically, his mother. Since the human infant depends for his survival on social agents in his environment, and since so much of the infant behaviour takes place in the presence of the social agents in his environment, researchers operating within the framework of traditional motivation theory (Haber, 1966), as well as ethological models, tended to emphasize the social aspect of infant–environment interaction. With the change introduced into psychological thinking about motivation in general, animal research on early-life stimulation and the work of Piaget, greater attention has recently been drawn to the non-social aspect of the infant–environment interaction (Hunt, 1960).

INFANT–ENVIRONMENT RESEARCH IN PERSPECTIVE

1. *The uni-directional arrow*

As was stated above, the majority of child psychologists supposedly working on infant–environment interaction have been engaged in investigating the impact that one member of the pair has on the other. Of all possible categories here, the most frequently investigated is the impact of maternal behaviour and attitudes on infant behaviour and development (e.g. Bayley and Schaefer, 1964; Lewis and Goldberg, 1969). Studies focusing on the non-social environment follow the same misconception, by studying the impact of the non-social environment (in terms of perceptual input) on infant behaviour and development (Rheingold, 1961, Fantz, 1966, 1967; McCall and Kagan, 1967; White and Castle, 1964; White and Held, 1966; Starr, 1970; Yarrow, Pedersen and Rubenstein, 1971). In recent years there has been a growing awareness that infant characteristics may determine maternal behaviour (Rheingold, 1966; Bell, 1968, 1971; Harper, 1971). This awareness, however, has led so far to only a few empirical studies. Yarrow (1965) looked at differential maternal behaviour of foster-mothers and Prechtl (1963) investigated mother–infant interaction in babies with minimal brain damage. Moss (1967) considered sex, age and state of infant as determinants of maternal behaviour, and Leach and Costello (1971) are currently investigating the differential treatment by mothers of their twin-infants.

The small number of studies in this category most likely reflects the lack of both adequate research designs and manageable recording techniques to investigate the impact of variations in infant characteristic on maternal behaviour, as well as the lack of a theory that will point at *finer* "infant characteristics" and their presumed impact on the mother. Variables such as sex, age, or activity level are fairly gross and give us very little leverage in the understanding of the relationship found between them and maternal behaviour.

Although this line of study is highly welcome, it again represents a misunderstanding of "interaction". Like the studies investigating the impact of environment on infant, the studies investigating the impact of infant on mother are focusing on different questions to those posed by a study of interaction proper. They all study the effect *A* has on *B*, whilst a study of interaction proper will continue to ask for the resulting effect in *B* and its impact on *A* which again will result in an impact on *B*. It is not even that they are studying *part* of the interaction, since the study of interaction proper will focus on the process of interaction rather than on the correlation between *A* and *B*.

In recent years, we have witnessed some attempts to break away from this unidirectional-arrow type model. One such attempt can be seen in studies which use variables such as "*dyadic* gazing" (Robson, Pedersen and Moss, 1969). Although such assessments do not yield any information about the process or *pattern* of interaction, they approximate to the notion of "interaction" by providing us with a measure that involves simultaneously both parties in the exchange. "Eye-contact" is a behaviour that necessitates, by definition, the active participation of 2 partners, and thus is a true interaction measure. It is different from variables such as "holding infant", "smiling at infant", "vocalizing at mother" (Moss, 1965). The latter variables, although depicting behaviour during interaction, do not measure interaction as such but rather the behaviour of *one* of the partners in it.

Another attempt to approximate to an analysis of "interaction" proper can be seen in work reported by Lewis (1971). In this study one records variables like those mentioned above (e.g. infant vocalization to mother; mother's smile to infant). The method of recording, however, provides us with the possibility of charting the "simultaneous occurrence" of bits of behaviour by infant and by mother. Thus, we find out the frequency in which infant and mother engage in certain behaviour *simultaneously*. The simultaneous occurrence of behaviour by 2 organisms present in one location (in full view of each other, and/or within hearing distance of each other), however, does not necessarily entail that interaction took place although it seems a reasonable assumption that it did (Lewis, 1971).

Again, such measures do not yield information about the *patterns* of interaction. However they do give us some interesting data concerning an estimate of *frequency* of interaction, *types* of behaviour that enter the interaction between infant and mother at a given age (the latter information is obviously curtailed whenever a pre-determined set of observation categories is used) and some possible information about the *context* in which interaction takes place.

In studying the interaction between infant and his non-social environment, we find similar attempts at approximating to a more adequate model of interaction. Yarrow, Pedersen and Rubenstein (1971) utilized a variable such as "responsiveness of stimuli" in describing the environment with which the infant interacts. Whilst the overall model is still the one of the "uni-directional arrow", such a variable takes into account some interaction properties of the stimuli and provides more adequate information than an overall assessment of a variable such as "level of stimulation".

2. *Methodological models and measurement techniques*

Different methodological models typically reflect differences in theoretical bias, basic interests, and what are considered as the most relevant questions about the phenomenon at hand. They also typically entail different levels of variable definitions and different measurement techniques.

We will focus here on what seem to be the 4 main models that have contributed some information about infant–environment interaction and its effects on infant development. Admittedly, most studies subsumed under three of these four headings suffer from the same misinterpretation of the concept of "interaction" as discussed above. The four models discussed are, (a) the deprivation model, (b) observation in the natural habitat, (c) the experimental model in search of basic processes, and (d) the search for an interaction model.

(a) *The deprivation model.* This model has been entertained by two different research traditions and within two different theoretical frameworks. One was inspired by Freudian thinking and focused on mother–infant interaction in humans, or more accurately, the lack of it. We refer here to studies on maternal deprivation (Goldfarb, 1944; Spitz, 1945; Yarrow, 1961; Bowlby, 1966). The other was inspired by Hebb's (1946) emphasis on the importance of stimulation during early-life for later learning and emotional development, an emphasis that led to a vast volume of experiments on infantile isolation and deprivation in animals (Melzack, 1968; Thompson and Grusec, 1970).

The impact of both traditions has led to the dramatic studies of Harlow (1961) on the effects of maternal separation and general stimulus deprivation on the development of rhesus monkeys.

A limitation common to all studies employing the deprivation model is that they yield very little positive information on the nature of infant–environment interaction. There are two main reasons for the poor information value of these studies in this respect. One involves the logic of the model—knowing that the *lack* of x yields results y, still does not inform one about the expected results of the *availability* of x but for a hunch that they might be *different* from y. And this is not very informative. Secondly, such studies have typically used a sledge-hammer approach by cutting off such a big chunk of the environment as to curtail immensely any possible explanatory statements about the effects of the deprivation. Thus we do not know what it is about the missing "mother", or what aspect of the missing "stimulation" that has resulted in whatever developmental handicaps were observed. For example, is it the lack of affectionate body-contact that leads to delinquency or is it the infrequent opportunities to be disciplined in a "warm loving" atmosphere? Is it the lack of complex visual–auditory stimulation, or the lack of stimulus redundancy that leads to inhibited exploratory activity? These are the type of questions that are essential to the understanding of infant–environment interaction and which are left unanswered by most studies employing the deprivation model. The confounding effect is even worse in the case of studies on maternal deprivation, as they typically do not distinguish between the effect of the lack of a "mother" and the effect of an overall impoverished institutional environment. However, the informative value of the deprivation model is considerably increased by occasionally focussing on some limited aspect of the restricted environment (e.g. the study of the effect of movable and immovable object experience on exploratory behaviour by McCall (1967); Rheingold and Bayley's (1959) study, employing experimental modification of mothering).

(b) *Observation in the natural habitat.* This model is used many times in lieu of an experimental design when the investigators wish to obtain information on variables which they feel are not open to experiment because of practical or ethical considerations.

The basic assumption is that if a large enough sample of homes is randomly selected from the population, they will reveal a wide enough range of variation in infant–environment interaction as well as an adequate range of scores on whatever infant development measure is used, so as to allow a correlational statement to be made about the relationship between them. Thus, information will be obtained as to the relative contribution of various "interaction" variables to variations in infant development. Random sampling from the population can be replaced with stratified sampling to yield comparisons across different types of environments (e.g. institution, middle-class, working-class) and different types of infants (e.g. boys, girls, different ages, brain damaged, etc.). Comparison of means would then replace or supplement correlational statements.

The observation-in-the-natural-habitat model covers a wide range of studies varying in their goals and techniques of data collection, hence yielding information differing in kind, validity and reliability. We shall limit our discussion to studies employing human infants only though similar studies have been carried out on other mammals (DeVore, 1963). A typical procedure employed by this model involves one or more home visits by an observer and/or interviewer. The data collected can be based on an interview with the mother about current events (Ainsworth and Bell, 1970; Schaffer and Emerson, 1964) or about past events, sometimes going as far back as five years (Sears, Maccoby and Levin, 1953). It can combine the interview data with data obtained by the observer/interviewer during the home visit (Schaffer and Emerson, 1964), or it may rely solely on the data obtained by the observer assessing the environment and possibly infant–environment interaction during the visit.

The observer may focus on social interaction only (e.g. Geber, 1958; Prechtl, 1963; Moss, 1965; Appel and David, 1965; Gewirtz and Gewirtz, 1968; Lewis, 1971) or limit himself even further to only one aspect of social interaction such as vocalization (Bateson, 1971). Alternatively, the observer may focus on non-social as well as social interaction (Caldwell and Richmond, 1967; Hunt, 1969; Yarrow, Rubenstein and Pedersen, 1971), and again may choose to limit himself, for example, to auditory and linguistic data (Friedlander, 1971). Once he decides what it is that he wishes to observe in the natural habitat, the observer may then proceed to use any one of a variety of observation techniques, from rating scales which are completed at the *end* of an observation period (Schaffer and Emerson, 1964; Yarrow, Rubenstein and Pedersen, 1971), through various time sampling procedures and frequency counts made *during* the observation (Moss, 1965; Gewirtz and Gewirtz, 1967; Lewis, 1971) to mechanical recordings, which in turn vary in their degree of elaboration from a relatively simple sound operated tape recorder (Bateson, 1971), activity and interactional monitor (Sander and Julia, 1966) to a very sophisticated electronic system (Costello and Leach, 1971). These studies have supplied us with a large number of statements describing relationships between maternal behaviour, environmental stimulation and infant behaviour. However, because they differed in their assessment methods and in the variables they chose to observe, it is difficult to obtain an overall picture of the nature of the relationships involved in the interaction between infant and environment. Furthermore, one cannot compare their results and assess the relative importance of the variables used.

Some experimental modifications of the natural habitat model, however, can be made. The observer may assign the mother several tasks to perform or put both infant and mother in a predetermined situation. In such a case, the structured situation (e.g. separation from mother, Ainsworth, 1969) enables an event to be studied which presumably happens normally in the natural setting but may or may not take place spontaneously during the observation period.

Another modification of the natural-habitat approach is the long-term introduction of an element which was not there in the first place (e.g. a mobile, Uzgiris and Hunt, 1965; Watson and Ramey, 1969). This has been used more as part of an experimental design, though possibilities exist for studying such partial intervention and their effect on the existing patterns of interaction in the natural-habitat. Another possibility, using intervention in the natural habitat, would be to change the *pattern* of interaction between infant and one set of elements in his environment and observe how this may trigger off changes in other patterns of interaction with other elements in the child's environment (Etzel and Gewirtz, 1967).

(c) *The experimental model—In search of basic processes.* This model does not fit in any obvious way into the study of infant–environment interaction yet it is an essential one for such a study.

The aim of this model is to explore in a systematic way assumptions concerning the psychological processes which take place during and which are effected by interaction. It may also provide a double check on various *ad hoc* explanations derived from the deprivation or natural habitat models.

It includes studies investigating other theories or hypotheses which have no direct relationship to one's interest in infant–environment interaction research, yet the nature of the variables or procedures employed have led to results which may have some important implications for such research [e.g. the influence of familiarization on the reinforcing effectiveness of visual stimuli (Siqueland, 1969); factors effecting heart rate changes (Kagan and Lewis, 1965; McCall and Kagan, 1967)]. The relevant literature in this context is quite extensive and some of it has been reviewed by Kessen, Haith and Salapatek (1970). Our purpose here is simply to emphasize the importance of this research model to a more meaningful understanding of the processes involved in the interaction between infant and environment. This statement is quite trivial, and there would be no reason for stating it here but for the fact that so many researchers engaged in the investigation of this interaction under the first two models seem to ignore both findings and methodology derived from this third experimental model.

The study of the basic processes underlying the interaction between infant and environment reflects again our biased interest in the infant's *response* to his environment. Very rarely, if at all, does it focus on the actual interplay assumed in true "interaction". Hence, we shall classify studies into two categories: (1) The case of non-contingent stimulation, and (2) the case of contingent stimulation.

Studies in the first category investigate infant's reponses to a wide range of stimuli given to them independent of their behaviour. A substantial amount of infant research of the last decade has devoted itself to problems related to the "arousal" dimension. One group of studies provide us with a description and analysis of "states" of infants (Bartoshuk, 1964; Bell, 1973; Bridger, 1965; Brown, 1964; Ellingson, 1967; Graham and Jackson, 1970; Parmelee, 1961). Another group investigated variations in states (arousal) as a function of environmental stimulation. Brackbill (1970) found for example, that increasing the *number* of stimuli of different modalities, brings about a decrease in crying, heart rate, irregularity of respiratory rate and in motor activity as well as an increase in quiet sleep. *Continuous* stimulation had no significant cumulative effect for states such as drowsiness and quiet awake. Whilst Brackbill looked at both directions of change in states, many other studies were interested mostly in the "soothing" effect of stimulation, such as tactile, oral, restraint, rocking (Korner and Grobstein, 1966; Rovee and Levin, 1966; Lipton, Steinschneider and Richmond, 1960; Ambrose, 1969). Korner and Thoman (1970) in a particularly relevant study showed how visual alertness (a precondition for visual scanning and exploration of an environment) can be evoked by some specific dimensions of maternal care, i.e. contact, vestibular and upright (CVU). The CVU combination was most effective in evoking visual alertness in *both* the crying and the sleeping infant.

Another group of studies focused on other behavioural correlates of various arousal states, such as smiling, frowning, REM (Emde and Koenig, 1969), interaction with mother (Moss, 1967).

Other studies looked at individual differences in arousal states (Escalona, 1962; Korner, 1970) and usually grouped them under categories such as sex and temperament.

It is obvious, that infant-state is both a variable which determines the effectiveness and range of infant interaction with his environment and a variable *in* the interaction (i.e. it changes as a function of the interaction). Thus, its importance in the process of interaction is far from being trivial and we suggest that a detailed explication of the role it plays in infant–environment interaction should be undertaken and the empirical implications of such an analysis tested.

One particular aspect of infant "arousal" has received considerable treatment over the last decade and we refer here to the process of attention (Kagan and Rosman, 1964; Kagan and Lewis, 1965). The knowledge of how various aspects of the environment (complexity, novelty, expectation violation, facedness) control infants attention, (and moreover the changes in attention over time as a function of repeated stimulation), has a paramount relevance to the understanding of the underlying perceptual and cognitive aspects of infant–environment interaction.

The application of findings and principles derived from this area of research to the gross suggestions yielded by the deprivation model may generate a fruitful line of research in infant–environment interaction (e.g. variation in familiarization learning as a function of infant's interaction with varying levels and varieties of environmental stimulation).

So far we have mentioned only the short-term effects of non-contingent stimulation. Studies by White and his colleagues (White and Castle, 1964) demonstrated some "long-term" effects of infantile stimulation such as handling. These studies may provide some suggestions as to some of the relevant dimensions in the study of infant–environment interaction.

Another category of research into basic processes can be described in terms of its strategy to make stimulation contingent on the behaviour of infant. The former line of study focused on the evoking aspect (Gewirtz, 1969) of stimulation as well as its role in setting up environmental patterns which the infant learns to expect (Lewis and Goldberg, 1969). The contingent stimulation model focuses on the feedback received by the infant, as a result of some action he takes (reinforcement) *vis-a-vis* his environment and how this feedback in turn changes his subsequent behaviour and expectations.

The choice of behaviour and reinforcing (or feedback) stimuli vary with the particular interest of the researcher; the variety investigated is great. Both responses and feedback stimuli vary on a dimension of their "social" implication and control. Thus, for example, (a) head turns and head movements were controlled by sight of bottle, voice of mother, movement of a mobile (Koch, 1968; Papousek, 1969; Watson and Ramey, 1969), (b) kicking controlled by mobile (Rovee and Rovee, 1969), (c) exploratory play-behaviour controlled by visual and auditory feedback (Siqueland, 1969; Friedlander and Kessler, 1965), (d) crying, smiling and vocalizing controlled by a variety of social stimulation (Brackbill, 1958; Weisberg, 1963; Etzel and Gewirtz, 1967).

The discussion of the relative usefulness of the concepts of "feedback" and "reinforcement" is beyond the scope of this paper but their relevance to the investigation of infant–environment interaction is very clear. To use a different conceptual framework, contingent stimulation with patterning of non-contingent stimulation determines the consistency and predictability of the environment with which the infant interacts.

(d) *The search for an interactive model.* The idea that a meaningful investigation of infant–environment interaction ought to focus on the analysis of the changing patterns of interaction flow proper, rather than on the correlation between infant and environmental variations, has been accepted by various investigators. The problem at the moment seems to revolve around finding an adequate statistical model to deal with such an analysis.

Gewirtz and Gewirtz (1969) attempted such an analysis of their data collected in 4 Israeli environments. Besides providing information on the relative frequency of interaction episodes in the different environments, their data yields some contingency tables with statements of the conditional probabilities of certain chains of interaction. A computer treatment of the more complex sequential analysis is offered by Haupt and Gewirtz (1968). Their treatment, however, is more a tentative exploration of a possible analysis rather than an absolute solution.

A similar attempt, on a much smaller scale, was presented by Freedle and Lewis (1971) who analysed contingency tables and some preliminary sequential statistics of mother–infant interaction. The interaction is described in terms of vocalization, holding, smiling, etc., in a similar fashion to Gewirtz and Gewirtz (1969). Instead of comparing interaction patterns in different environments, however, Freedle and Lewis deal with sex differences in interaction.

Even on a smaller scale, and still within the same framework of Markovian assumptions is the analysis of vocalization–interaction sequences by Bateson (1971). Her study deals with "proto-conversations" between mother and infant. The emphasis of the analysis is on the importance of vocal exchange in affirming *contact* rather than on content or exchange of information. Her data consists of half hour stretches of behaviour, filmed and taped at home during which the normal routine was followed. Her graphs yield simultaneous recordings of both mother and infant utterances or vocalization. Her analysis so far has looked only at the statistics of the mean time of utterance onset, from onset of previous utterance. It was found that for both mother and infant this time was longer when the previous utterance was made by self than when the previous utterance was made by other. Thus, it seems that both partners in such "proto-conversations" say something and then wait for a response from the other before renewing their vocalization.

The Markovian model is predominant now and no other alternatives are known to the writer. The task of applying the model to the rich and intricate interaction data seems rather formidable and impossible without adequate computer programmes. An alternative would be to limit the research to one segment of the interaction only (e.g. Bateson, 1971), obtaining a substantial record of that segment and possibly limiting the investigation to one interacting unit at a time.

It is obvious, however, that for this type of analysis one must obtain detailed and accurate data. Data from interviews, questionnaires and rating scales would be totally inadequate for such a purpose. Data obtained by direct observation, using various time sampling techniques (e.g. Gewirtz and Gewirtz, 1969; Freedle and Lewis, 1971) is adequate, but extremely expensive when the cost of a unit of data in observer's time is calculated.

To obtain detailed and accurate data, one must choose well defined and easily observable* aspects of interaction. This usually necessitates the limiting of the range of interactions to be studied which in turn facilitates the task of the observer and usually increases the reliability of his records. Observation difficulties have been further alleviated by the use of new technological devices to obtain and record interaction data. The application of these to the study of interaction patterns in the "natural habitat" is particularly interesting and promising. Although the initial investment is quite high, the use of recording and computer facilities becomes more economical in the long-term and permit more comprehensive research projects. Louis Sander and his colleagues (Sander and Julia, 1966); Sander *et al.*, 1969; Sander *et al.*, 1971) have devised methods of continuous recording of (24 hr) patterns of infant states and of caretaker interventions. Their data also includes detailed daily event-recording of infant–caretaker interaction in the feeding situation, and assessment of infant responses to visual stimulation. Their research project focuses on the study of individual differences among the patterns of awake–sleep states of infants during their first month of life, and relates these differences to differences in caretaker's identity as well as differences in caretaking regimes (rooming-in vs. nursery). As stated by Sander (1971), the activity and interactional monitor was never intended to produce data that could be used in a contingency analysis. It is clear, however, that the technique can be used with some modification to yield more detailed information about sequential changes in the behaviour of caretaker as a function of behaviour of infant and vice versa. The choice of variables to be recorded continuously will reflect the interest of the researcher, as well as the obvious limits of the recording device. It seems, however, that even within these limits detailed and accurate interaction data may be obtained.

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* "Easily observable" does not necessarily mean easily seen to the naked eye. Interaction may be observed with or without instruments. The word "easy" refers to the amount of interpretation required in presenting the observation.

A somewhat different orientation, yet making a similar contribution, is to be found in a study reported by Costello and Leach (1971)—(also Leach and Costello, 1971). This study attempts to test the hypothesis that the behaviour of infants, from birth onwards, affects the way in which their mothers handle them. The population chosen for this purpose is that of twins, to provide an adequate control for overall environmental characteristics. The assumption is that most of the observed variations in within–pair infant behaviour and within–pair differences in maternal handling should occur among dizygous twins. Their interview and observation data has been supplemented by continuous 24 hr electronic recording of infant's movements, fundamental pitch of sounds near infant and the proximity of the mother to the infant as well as "cuddling time". The proximity measures are obtained by the use of a transmitter of low powered radio-waves which the mother wears, a receiver fixed to the cot and a receiver with an integrating recorder which the infant wears. However cumbersome and forbidding the instrumentation may sound, it does yield finer-grain data of interaction, the attainment of which seems to be one of the more important current goals of the study of infant–environment interaction.

Another study mentioned above (Bateson, 1971) used mostly synchronized tape and film of infants and mother in "conversational" situations at home. A coded subsonic signal makes it possible to associate sounds on the tape, as well as marks on graphic-level recordings with specific frames of the film. Vocalization characteristics may be analysed from spectrograms. Using these recordings, one can then mark by hand the vocalizations of each participant and thus obtain the interaction data for analysis. Besides the analysis of vocal interactions one can then make use of the video-film and relate vocal and non-vocal interactions. Since a longitudinal sample is available, one can further relate these interactions to speech development.

We mentioned here only 3 projects which make a heavy use of electronic and mechanical recordings. Other studies may only partially supplement their observations by such devices. So far, we have seen the use of event-recorders, video and sound (including sound-operated) tape recorders, stabilimeters and other activity measuring instruments. In addition to these, if and when computer facilities become cheaper, we may see computer terminals planted in the "natural habitat" for simultaneous recording and processing of data, as well as the provision of "intervention" in a controlled fashion. A note of caution seems appropriate here: the impression may be gained that video and tape-recording provide more "objective" data than direct observation. One should be aware, however, that films, tapes and spectrograms still have to be observed and the same pitfalls of "interpretation" prevail here, as in any other set of observations. The main advantage of this manner of recording is in lifting the time pressure off the decision making process of the observer.

We have described here a few innovations in the techniques of recording infant–environment interaction. Common to all of them is the attempt to obtain data relatively free of observer's bias and interpretation, and more continuous and richer in terms of the volume of observations obtained on any given infant. Although it may all sound like a "brave new world" type programme, it seems to the writer that it is this type of data which is required for an adequate analysis of chains or patterns of infant–environment interaction.

DISCUSSION

The study of infant–environment interaction involves two aspects of investigation and thus reflects two main levels of interest in the phenomenon. The first aspect is that of description, which searches for the most meaningful units in which to describe the interaction and how they may be most adequately and reliably recorded.

The other interest in the study of infant–environment interaction, regards the interaction as either a dependent or independent variable which is then related to another set of events or classification. The comparison of infant–environment interaction patterns across age groups, sex, ethnic groups, social class, etc. treats the interaction as a dependent variable. The comparison of infants and children in terms of cognitive, emotional and physical development as a function of variations in their interaction with their environment, treats the interaction as an independent variable. Another interesting use of infant–environment interaction as an independent variable, particularly the aspect of infant–mother interaction, has been neglected so far. It is interesting to study changes in the behaviour and perception of mothers and caretakers (adaptation, adjustment) as a function of their interaction with infants.

Our main argument in this paper is that whatever the level of interest of the researcher is, descriptive, predictive or causal, there are some basic requirements that must be fulfilled for an interaction study to be adequate. First, interaction must be studied as such rather than inferred from correlation co-efficients between aspects of the environment and the behaviour of the infant. A proper study of interaction must regard it as a process in which both perceptions and behaviours are changing continuously as a function of earlier events in the process.

Secondly, to capture and depict this process, for descriptive or other purposes, requires a revision of the *research* designs, *observation* tools and *statistical* analysis employed so far by most investigators attempting to work on infant–environment interaction. Some partial revisions of that nature have been described earlier.

Thirdly, a meaningful study of infant–environment interaction must not limit itself to one type of research design or one source of data. It should rather continuously incorporate data obtained in, (1) natural-habitat, (2) experimentally modified natural-habitat, and (3) laboratory-controlled-studies of basic processes underlying the interaction between infant and environment.

Only by continuously integrating the data derived from these different sources will we get meaningful and fruitful definitions of interaction units and be able to set up hypotheses about the relationship between "interaction" and other variables.

After half a century of struggling with both the concept of infant–environment interaction and inadequate data concerning the basic issues of such an interaction, it does seem that child psychology is getting closer to a better understanding of the phenomenon.

In conclusion, we have observed: (a) a relative reduction in theoretical bias emphasizing selected aspects of the interaction (e.g. toilet training); (b) an increased awareness that interaction means a *relationship* between two or more members, rather than the impact of one *on* the other; (c) an increased sophistication in recording techniques, methodology, design and statistical techniques; and (d) an increased volume of knowledge which is pertinent to the understanding of the psychological processes involved or underlying the interaction between the infant and his environment.

The further application of methodological and statistical models employed in other areas of research, dealing with concepts of "interaction" (e.g. small-group research), as well as advances in recording techniques, may give us in the near future a better strategic tool to deal with the complexities of the infant–environment interaction phenomenon.

SUMMARY

This paper has pointed out some of the issues, difficulties and hopes involved in the research into the area of infant–environment interaction. A short exposition of the meaning of basic concepts of "interaction", "infant" and "environment" was given. Viewing infant–environment research in perspective reveals a basic misunderstanding of the concept of "interaction" in its typical interpretation as the-impact-of-environment-on-infant, or the more recent interpretation as the-impact-of-infant-on-environment. This mis-understanding holds both for studies investigating the social environment (mother, foster-parents, caretakers) as well as the non-social environment (isolation, enrichment, mobiles). Four different research models were reviewed and some of their differences, contributions and limitations pointed out. Finally, some new developments were discussed that seem to indicate a somewhat more sophisticated approach to this area of research. Whether these advances will yield a better understanding of the complexities of infant–environment interaction and its effects on infant (and parental) development is still an open question.

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BOOK REVIEWS

Determinants of Children's Game Style. RIFKA EIFERMANN. The Israel Academy of Sciences and Humanities, Jerusalem, 1971, pp. 100.

Child's Play. R. E. HERRON and B. SUTTON-SMITH. John Wiley & Sons, Inc., New York, 1971, pp. xii + 386. £.450.

RIFKA EIFERMANN's monograph reports part of a study aimed to test some implications of Sutton-Smith's hypothesis that games are motivated by inner conflicts resulting from the childrearing practices of particular social groups, and serve both to assuage these conflicts, and to instil the cultural values of the group. Games of chance are the response of the underprivileged to their early responsibilities, passive status and lack of choices. Games of strategy deflect the anger of the young of higher status, complex societies, aroused by their early training in obedience, onto simulated combats and competition, and teach them the relevant skills. Games of physical skill are prevalent when the emphasis is on achievement and success.

The study relies on careful observation of children in schools in privileged and disadvantaged areas of Jerusalem during their break times. The games they played were rated in terms of the elements of chance, physical skills, strategic thinking, memory and attention they contained or required. Percentages of privileged and underprivileged boys and girls taking part in these were compared. Memory and attention were involved in a number of games played by low status girls. Contrary to prediction, more boys than girls took part in strategy games. But strategy games were played more by high status children, while low status children played more games involving chance, and more boys than girls played games involving predominantly physical skills. Broadly, these results were in accord with the theory. Eifermann, however, very properly questions whether this necessarily supports the link with childrearing and conflict which Sutton-Smith's theory assumes. Findings from her total sample showed correlations between school achievement and type of game. An interpretation in terms of competence required in the relevant games would be at least equally plausible. This raises a number of questions which warrant experimental investigation. The monograph might have gained from a more detailed account of statistical methods used. But as an untendentious investigation, based on detailed observation and ratings, the study is a welcome contribution in this area.

"Child's Play" is a collection of reprints representing some of the main approaches to studies of play. It includes Beach's classic paper, suggesting that the concept of play reflects nothing so much as our ignorance, Parten on preschooler's social play, Hurlock's review of early studies of individual difference variables, and Levin and Wardwell's review of research using doll-play within mainly psychoanalytic frameworks. More recent are further data by Eifermann relevant to some implications of Piaget's and Sutton-Smith's theories, and Hutt's refreshingly experimental study of specific and diversive exploration as defined by Berlyne. Theoretical articles include Gilmore's suggestion that play is a special behaviour, and exchanges between Piaget and Sutton-Smith. Cohesion between sections is provided by linking articles in terms of Robert's and Sutton-Smith's emphasis on self-expressive functions and social determinants. More puzzling is their definition of formal games as the "exercise of voluntary control systems, in which there is a contest of powers, confined by rules in order to provide a disequilibrial outcome", and of which play is the supposed precurser. Thus, the purpose of games is mastery, their content depends on the social, cognitive, affective and conative powers being exersised and tested, and the outcome is "disequilibrial" because some one wins or something is innovated. This begs the purely empirical question whether all playful behaviour involves testing skills (all behaviour necessarily exercises something), but also goes beyond the use of the term "play" in ordinary speech where it applies only to voluntary behaviour that seems in some sense paradoxical: friendly fighting, exploring the seemingly familiar, sex without coition, pretence not intended to deceive, "purposeless" innovations. Perhaps the only thing on which all contributions agree is that play is neither motiveless nor biologically useless. But the very multiplicity of assigned motives (displaced conflict, over-generalization of reinforced behaviour, escape from boredom, curiosity and stimulus seeking, practice of skills, to name but a few) and of possible benefits (allaying anxieties, resolving conflicts, optimal arousal, mastery of physical and cognitive skills, vicarious acquisition of knowledge, internalization of symbolic activities, social and cultural learning, group cohension), and the fact that any voluntary activity from spitting to the multiplication table can become a game, makes play a poor candidate if the search is for some special underlying motive, purpose or structure which applies to it uniquely. This is not to suggest that studies of play are useless or redundant. The fact that the higher primates particularly exhibit various kinds of voluntary behaviours which are not uniquely predictable from known organic deficits or social constraints (and thus seemingly paradoxical or surprising) must have important implications for the structure and functioning of these organisms. These may well need description in terms of the development of various control systems. But, in the opinion of this reviewer at least, it would be more useful now to concentrate less on all purpose explantations, and more on specific questions about specific conditions which elicit and change "playful" aspects of different kinds of voluntary activities, and on methodology. Techniques which have to dispense with imposed tasks need not be less rigorously experimental. Herron and Sutton-Smith are very much aware of the need for well controlled experiments and have provided some testable if somewhat large scale hypotheses. The book performs a useful service in making easily available to students some papers bearing on the history of the subject, and providing some pointers to future, and hopefully, more experimentally based studies. SUSANNA MILLAR

Psychological Theory and Educational Practice. H. S. N. MCFARLAND. Routledge and Kegan Paul, London, 1971, pp. xii + 323. £2.25

IT IS perhaps an interesting reflection on the state of the science that there have been so few British textbooks written about the relevance of psychology to education. In view of the recent Government directive towards the need for growth in postgraduate training courses for educational psychologists and in view also of the fact that psychological theory plays at least some small part in just about every teacher training course, this apparent reticence amongst British psychologists is all the more surprising.

At one level, therefore, Professor McFarland's new book can be seen as a significant addition to the literature and can be compared usefully with texts, such as those by Lovell and Stones, having broadly similar aims. Within this context, *Psychological Theory and Educational Practice* stands the test of comparison well. Particularly in the middle section of the book we are given a lucid and interesting guide through various aspects of the psychology of early and middle childhood and adolescence, each chapter summarising relevant recent research and important theoretical standpoints on cognitive, moral, physical, social and emotional development. The chapters on learning, too, are clear and to the point, carefully avoiding many of the pitfalls that make this area so confusing to the non-psychologist. A particularly attractive feature is the way in which the author concludes each chapter with a section attempting to bring the various threads together and place them in some kind of practical perspective. Wherever possible, reference is made to relevant British studies, most of which are readily available to the student who wishes to delve deeper.

Ultimately, however, all books of this nature are setting themselves an impossible task. The more successful attempts to relate the findings of psychology to the practical problems of education are inevitably those in which the authors, recognising the enormity of the task from the outset, deliberately restrict themselves to one specific area such as cognitive development, motivating learning, interpersonal relationships or special educational needs. Any attempt to do justice to the significant research findings or even to present a simplified analysis of the major problems in all of these fields within the space of three hundred pages is surely doomed to failure. The reviewer, as in this case, will inevitably pick upon, say, the twenty-seven pages "covering" handicap and behaviour problems and ask, "Why is there no reference to this study or that one?" In the area of maladjustment, for example, no mention is made of the basic work of Stott or Rutter or Shepherd or even of most of the important American studies apart from that of Thomas, Chess and Birch. No less than five references are made within the space of three pages to Jackson's book on Special Education—in itself a digest of material from other sources, leaving one with the impression that "For Special Education read Jackson" would have done the job just as well.

A recent Peanuts cartoon ended with the memorable line, "No book on psychology can be any good if one can understand it!" In this there is more than a germ of truth. Education is a vast area presenting many problems; the nature of psychological explanations is far more complex than most non-psychologists would like to believe; the connections between the two disciplines are often tenuous and never simple. All this Professor McFarland recognises and attempts to elucidate in his opening chapter. Unfortunately, I believe that he comes close to confirming the Peanuts paradox as it is this chapter that student teachers will find most difficult to understand. This does not mean that their endeavours will not be worthwhile. The author's style is not always helpful here; he has a fondness for confusing analogies and often seems to stray from the point; occasionally he is just too long-winded, but his intention is always to provoke thought and in this I believe he succeeds.

It seems to me that one of the most valuable functions of any introductory text in applied psychology is to consider what psychologists are trying to do and why they are trying to do it. Few authors make mention of the second of these questions, far less seek for any answers. This book goes further than most in a consideration of such problems. R. L. BURDEN

autism, educational treatment,
follow-up

Rutter, Michael and Bartak, Lawrence (1973) Special educational treatment of utistic children: a comparative study—II. Follow-up findings and implications for ervices. *J. Child Psychol. Psychiat.* **14,** 241–270.

Summary—Autistic children attending three different special units were followed up over a 3½–4 yr period to assess changes in educational, cognitive, linguistic, social and behavioural status. The group as a whole had made considerable progress in all spheres and it was concluded that the results amply justify the provisions of special education for autistic children. Comparisons between the units suggested that large amounts of specific teaching in a well-controlled classroom situation is likely to bring the greatest benefits in terms of scholastic progress. The findings are used to consider a variety of specific questions in relation to the optimum types of schooling required for autistic children.

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design-criteria, behavior research,
children

MacDonough, Tomi S. and McNamara, J. Regis (1973) Design-criteria relationships in behavior therapy research with children. *J. Child Psychol. Psychiat.* **14,** 271–282.

Summary—Distorted underestimates (Pawlicki, 1970) of the scientific adequacy of behavior therapy research with children has resulted because appropriate design-criteria relationships were not considered in evaluating studies in this area. Eighty per cent of the studies have appropriately incorporated the criteria of control group, baseline, and systematic variation of treatment into their designs. However, even when design-criteria relationships are considered, a number of criteria have been inadequately controlled for in a large percentage of studies. In fact, the criteria of unbiased observer and follow-up have, on the average, been controlled for in only 46 per cent of the studies reviewed. If the scientific merit of research in this area is to be accepted, then more attention to tightening controls on these variables is needed.

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delinquent, acting-out,
absconding

Sinclair, I. A. C. and Clarke, R. V. G. (1973) Acting-out behaviour and its signif for the residential treatment of delinquents. *J. Child Psychol. Psychiat.* **14,** 283–29

Summary—A measure of "acting-out" behaviour in the form of absconding, to with measures of the effectiveness of treatment and quality of intake, were ob for 66 boys' approved schools. Using correlation techniques it was shown that with high levels of absconding were less effective than might have been expected fr standard of their intake (as measured by I.Q. and number of previous court a ances). It was suggested that on the evidence presented "acting-out" in gen not to be encouraged, although clearly further investigation is required.

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orientation, discrimination,
matching–mismatching
frameworks

Fellows, Brian J. and Brooks, Brenda (1973) An investigation of the role of m and mismatching frameworks upon the discrimination of differently orientat stimuli in young children. *J. Child Psychol. Psychiat.* **14,** 293–299.

Summary—In a delayed matching-to-sample experiment with 50 5-yr old c it was found that the presence of square or diamond frameworks did not signi effect the discriminability of horizontal and vertical lines, nor that of mirror- oblique lines, though performance on the former was significantly better than latter. These results indicate that young children do not, as Bryant (1969) pr spontaneously adopt a match–mismatch perceptual code on this type of task. It that the child's problem is to find some way of representing the sample stimuli absence. Whether the child uses a matching code, or a mediating response, or n seems to depend mainly upon the way he is prepared for the task.

APPENDIX

Individual schools' absconding rates in 1964, together with the success rates, mean intelligence, and mean previous court appearances of those discharged to after-care from each school in 1965

Senior Schools					Intermediate Schools					Junior Schools				
School	Abscon-ding rate	Success rate	Mean I.Q.	Mean prev. ct. appears	School	Abscon-ding rate	Success rate	Mean I.Q.	Mean prev. ct. appears	School	Abscon-ding rate	Success rate	Mean I.Q.	Mean prev. ct. appears
1	6·5	42·5	89·4	2·43	1	5·0	37·5	93·0	2·55	1	0·0	14·3	93·8	1·50
2	14·0	31·3	87·1	2·53	2	8·0	42·3	91·5	2·41	2	0·0	30·2	93·1	2·33
3	14·0	39·4	94·6	2·81	3	9·5	51·9	105·1	1·94	3	1·0	48·3	106·2	1·97
4	16·0	42·6	94·2	2·65	4	9·5	54·7	103·8	2·14	4	1·5	52·2	91·1	2·68
5	19·0	32·8	92·4	2·62	5	14·0	32·1	92·5	2·40	5	2·5	64·7	97·9	2·31
6	20·5	43·8	96·9	2·21	6	15·5	47·8	90·4	2·21	6	3·0	29·5	85·2	2·31
7	21·0	40·0	97·3	2·31	7	18·5	27·0	93·5	2·42	7	3·5	46·9	97·6	1·97
8	23·0	45·7	99·8	2·33	8	18·5	41·1	92·2	2·43	8	4·5	33·3	86·8	2·29
9	23·0	46·3	101·6	2·25	9	19·5	40·3	97·7	2·32	9	6·5	25·9	100·3	2·39
10	24·5	31·1	98·5	2·75	10	21·0	37·3	99·0	2·32	10	8·5	46·2	91·3	1·83
11	25·5	32·0	92·4	2·70	11	21·0	46·9	88·1	2·38	11	9·0	42·9	92·1	1·33
12	26·5	45·6	118·0	2·18	12	22·5	33·8	89·2	2·22	12	9·0	42·9	93·4	1·89
13	28·0	36·8	100·9	2·40	13	22·5	48·8	106·3	2·45	13	11·0	27·3	91·5	1·75
14	28·5	51·0	102·0	1·82	14	23·0	23·5	94·1	2·35	14	12·5	34·9	93·1	2·12
15	30·5	37·8	97·4	2·63	15	23·0	41·9	95·9	1·93	15	13·5	22·7	91·9	1·86
16	31·0	28·8	97·3	2·56	16	23·0	53·3	84·8	2·33	16	15·5	26·1	92·3	1·68
17	32·5	35·4	94·4	2·88	17	30·5	32·8	100·3	2·30	17	18·0	14·3	88·6	1·80
18	34·5	33·3	85·8	2·75	18	33·5	32·9	93·8	2·66	18	18·5	36·4	93·9	1·50
19	35·0	29·6	88·1	2·33	19	33·5	34·9	83·8	2·29	19	18·5	53·8	91·6	1·93
20	35·5	46·4	92·2	2·37	20	35·0	35·0	100·3	2·19	20	21·5	13·6	97·6	1·72
21	39·0	27·8	84·2	2·15	21	35·0	41·3	89·7	2·17	21	23·0	20·8	95·4	1·63
22	44·0	22·7	88·8	2·47	22	81·5	44·4	124·9	1·66	22	24·5	27·3	91·8	2·05

infant–environment interaction issues

SENTHAL, MIRIAM K. (1973) The study of infant–environment interaction: some nments on trends and methodologies. *J. Child Psychol. Psychiat.* **14,** 301–317.

mmary—This paper has pointed out some of the issues, difficulties and hopes olved in the research into the area of infant–environment interaction. A short osition of the meaning of basic concepts of "interaction", "infant" and "environment" s given. Viewing infant–environment research in perspective reveals a basic mis- derstanding of the concept of "interaction" in its typical interpretation as the-impact- environment-on-infant, or the more recent interpretation as the-impact-of-infant-on- vironment. This mis-understanding holds both for studies investigating the social vironment (mother, foster-parents, caretakers) as well as the non-social environment olation, enrichment, mobiles). Four different research models were reviewed and me of their differences, contributions and limitations pointed out. Finally, some new velopments were discussed that seem to indicate a somewhat more sophisticated proach to this area of research. Whether these advances will yield a better under- nding of the complexities of infant–environment interaction and its effects on infant nd parental) development is still an open question.

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